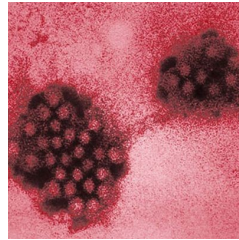
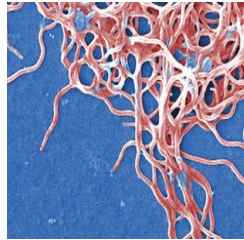
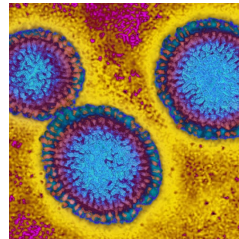
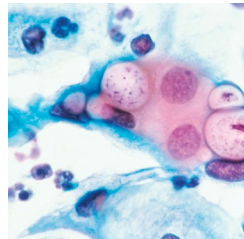
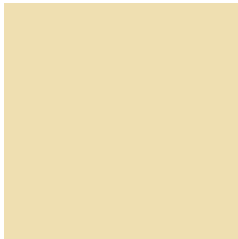


# 2021

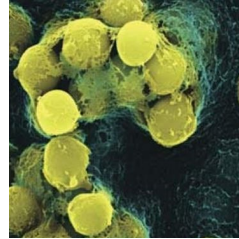
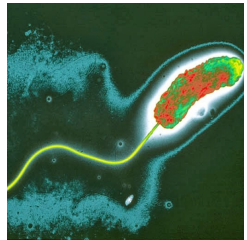
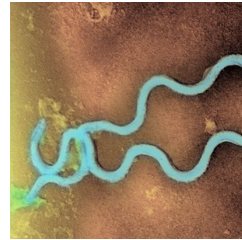
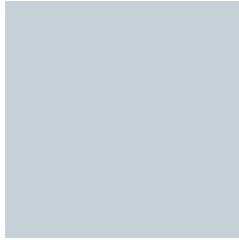
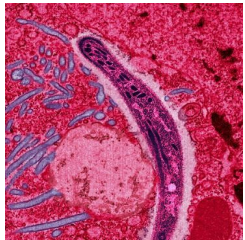
## Communicable Disease Report



Davis County  
Health Department



Communicable Disease &  
Epidemiology Division





## Prepared by Davis County Health Department

**Brian Hatch**, MPH, EHS  
Health Officer

**Sarah Willardson**, MPH  
Division Director

**Maggie Matthews**, MPH  
Epidemiologist

**Matt McCord**, MSPH  
Epidemiologist

**Brandon Beagles**, MPH  
Epidemiologist

### Acknowledgments

Nirmal Chahal  
Lorene Hovey  
Jessica Lambertsen  
Tina L'Estrange  
Lisa Martinez  
Neriza Oka  
Melissa Pace  
Caitlin Pratt  
Susan Stonehocker



22 South State Street  
Clearfield, Utah 84015  
801-525-5200

[www.daviscountyutah.gov/health](http://www.daviscountyutah.gov/health)



For questions about this report, contact: Brandon Beagles, 801-525-5148 or  
[bbeagles@co.davis.ut.us](mailto:bbeagles@co.davis.ut.us)





## Table of Contents

	Page Number
Executive Summary	1
Introduction	3
Utah Reportable Diseases	5
Methods	6
Reportable Disease Summary	7
Top 20 Diseases	9
Diseases Reported by Year, 2016-2021	10
Enteric Diseases	11
<i>Campylobacteriosis</i>	13
<i>Cryptosporidiosis</i>	14
<i>Giardiasis</i>	15
<i>Norovirus</i>	16
<i>Salmonellosis</i>	17
<i>Shiga Toxin-Producing E. coli Infection</i>	19
Vaccine-Preventable Diseases	20
<i>Hepatitis A</i>	22
<i>Hepatitis B</i>	23
<i>Influenza</i>	24
<i>Pertussis</i>	26
Vector-borne/Zoonotic Diseases	27
<i>West Nile virus</i>	28
Invasive Diseases	29
<i>Invasive Streptococcal Infections</i>	30
Other Diseases	32
<i>Carbapenem-Resistant Enterobacteriaceae</i>	33
<i>Hepatitis C</i>	34
<i>Legionellosis</i>	35
Sexually Transmitted Diseases	36
<i>Chlamydia</i>	38
<i>Gonorrhea</i>	40
<i>Syphilis</i>	42
Tuberculosis	43
<i>Active Tuberculosis Disease</i>	44
<i>Latent Tuberculosis Infection</i>	45
Novel Coronavirus Disease (COVID-19)	47
<i>Multisystem Inflammatory Syndrome - Children (MIS-C)</i>	51
Davis County Demographics – 2021	52

## Executive Summary

This annual communicable disease surveillance report summarizes all communicable diseases reported in Davis County during 2021. It provides an overview of the disease burden in Davis County, Utah, describing trends and highlighting those diseases that had the greatest impact on the health and well-being of our community. Unusual disease occurrences are also discussed.

Several notable disease events occurred in Davis County during 2021. These have been summarized below:

- The most notable event of 2021 has been the continuation of the **COVID-19 pandemic**. Response efforts adapted to COVID-19 as circumstances continued to change. Davis County Health Department continued to employ additional employees to properly respond to the different needs of the pandemic. These needs included case investigations, testing, data surveillance, vaccines, and following up with worksites, schools, and healthcare facilities. Davis County Health Department also coordinated several testing and vaccine events as a resource to worksites or healthcare facilities to prevent and control COVID-19 outbreaks.

Multiple vaccines for COVID-19 were developed by different pharmaceutical companies. Initially, vaccines were first administered to healthcare and other at-risk workers during late 2020 and early 2021. Soon thereafter, high-risk populations were the next priority, which included older populations and those with pre-existing or other health conditions. Throughout the rest of 2021, vaccines became incrementally available to almost the entire population, with the exception of children under the age of five. Vaccine recommendations continued to evolve during 2021 as more data and evidence became available. By the end of 2021, to be considered up-to-date on COVID-19 vaccinations, most individuals would need to receive the primary series of the vaccine, plus a booster shot. Booster shots are important to ensure improved continuous protection against COVID-19.

Several variants of COVID-19 were identified during 2021 through whole genome sequencing. These variants had different properties related to virulence, treatment ineffectiveness, vaccine protection, and disease severity. The most notable variants of COVID-19 in 2021 were Alpha, Delta, and by the end of the year, Omicron. While Davis County saw a surge of cases in Fall 2021 due to the Delta variant, the arrival of the Omicron variant at the end of 2021 quickly surpassed it as the predominate circulating strain.

- During 2021, **West Nile virus** cases reported in Davis County increased. There were a total of nine cases reported, one of which resulted in death. There are two ways to classify West Nile virus, neuro-invasive or non neuro-invasive. The majority of the cases reported in Davis County were classified as neuro-invasive.
- The **2020-2021 influenza season** (which is tracked from October 2020 through May 2021) continued to be impacted by the ongoing COVID-19 pandemic. The established COVID-19 control measures, (including mask use, physical distancing, and travel restrictions) could be an important reason why the 2020-2021 influenza season was mild in severity. There were three hospitalized cases, all due to influenza A.

- In 2021, there was a total of 104 reported cases of **carbapenem-resistant enterobacteriaceae**, which is a 42.5% increase from the 73 cases reported in 2020. This increase is likely attributed to an outbreak of *Acinetobacter* species at a Davis County facility, which had 21 cases associated with this outbreak. Public health continues to learn more about these organisms, including where they are occurring and how to prevent their spread.
- There was an increase in **norovirus** in 2021 with a total of 36 cases. Among those cases, two were associated with an outbreak that was identified at a restaurant located in Davis County. Norovirus is the leading cause of foodborne illnesses in the United States and it is most commonly found in health care facilities and restaurants or banquet facilities.
- In 2021, one case of **Hansen's disease** (leprosy) was reported in Davis County. Hansen's disease is an infection that is caused by the bacteria *Mycobacterium leprae*. This bacteria can affect several parts of the body, including nerves, eyes, skin, and the lining of the nose. It is unsure how Hansen's disease spreads within the population. Scientist theorize it is spread when an individual infected with leprosy coughs or sneezes, and another individual breathes in droplets containing the bacteria. In order for someone to get Hansen's disease, an individual must have prolonged exposure with someone who has untreated leprosy over months. Hansen's disease can be treated, which has made it possible for those infected to live an active life.

# Introduction



The Davis County Health Department Communicable Disease and Epidemiology (CD/Epi) Division works in partnership with the medical community and neighboring health jurisdictions to control and prevent the occurrence and spread of communicable diseases. This is accomplished through disease surveillance, disease investigation, coordination of prevention efforts, treatment, education, training, and policy development. The Division aims to:

- Interrupt and contain the spread of communicable diseases within the community;
- Conduct surveillance for over 80 communicable diseases and syndromes;
- Provide education to infected and exposed citizens;
- Facilitate appropriate treatment and preventive therapy;
- Enforce measures that protect the community (e.g. isolation); and
- Develop and advocate for policies to address priority health issues.

The CD/Epi Division is organized into four main program areas: **STD/HIV, Tuberculosis Control, Infectious Disease, and Disease Surveillance.**

## **STD/HIV Program**

Sexually transmitted diseases (STDs) affect men and women of all ages, backgrounds, and economic statuses. The United States has made progress in identifying cases through better testing procedures, sexual partner testing and treatment, and risk-reduction education. There are still an estimated 20 million new cases of STDs acquired in the United States each year. Human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), chlamydia, gonorrhea, syphilis, and chancroid are the STDs reportable by law in the state of Utah. Hospitals, laboratories, physicians, and clinics are mandated to report these diseases to the local health department.

The STD/HIV Program strives to ensure that infected individuals are interviewed by a trained communicable disease nurse to:

- Verify that appropriate treatment was prescribed and administered;
- Confidentially identify and notify contacts/partners of infected individuals who may have been exposed and facilitate testing and treatment; and
- Provide risk-reduction counseling and education.

## **Tuberculosis Control Program**

The Davis County Tuberculosis (TB) Control Program is dedicated to the prevention, control, and elimination of TB disease and the identification and treatment of latent TB infection (LTBI).

The successful control of TB in Davis County is largely due to the following program activities:

- Early identification, isolation, and appropriate treatment of individuals suspected of or diagnosed with tuberculosis disease;
- Effective contact investigation activities to identify individuals exposed to TB and completion of medication therapy for those diagnosed with LTBI; and
- Targeted testing for those who are at higher risk for developing TB following an exposure (e.g. homeless, foreign-born, residents of correctional institutions, substance abusers).

## Infectious Disease Program

Communicable diseases reportable in the state of Utah, with the exception of STDs and TB, fall under this program. Once reported, the Infectious Disease program implements the following activities:

- Interview infected individuals to obtain a thorough history, attempt to determine the source of exposure, and identify exposed contacts;
- Review and interpret laboratory results;
- Implement necessary control measures to interrupt disease transmission (e.g. exclusion from work/school);
- Monitor the disease process, assessing for changes in expected manifestations;
- Facilitate appropriate treatment and prophylaxis for those infected or exposed;
- Provide education on the specific disease and important preventive measures; and
- Formalize findings and report to the Utah Department of Health (UDOH).

The Infectious Disease Program has been further divided into the following categories:

- **Enteric Diseases:** bacterial, viral, and parasitic diseases involving the gastrointestinal tract
- **Vaccine-Preventable Diseases:** diseases that are preventable with vaccines
- **Vector-borne/Zoonotic Diseases:** diseases transmitted by insects, animals, or birds
- **Invasive Diseases:** bacterial or viral infections of the blood stream, cerebral spinal fluid (e.g. meningitis, encephalitis) or other normally sterile sites (e.g. synovial, pleural, or pericardial fluid)
- **Other reportable diseases/conditions:** diseases that do not fall under the above categories

## Surveillance Program

The Surveillance Program is responsible for the systematic collection, analysis, and dissemination of data pertaining to infectious diseases of public health importance. The goal of the Surveillance Program is to provide statistics that prompt public health preventive action. Core functions of the Surveillance Program include:

- Providing medical professionals with access to disease reporting 24-hours a day/seven days a week
- Maintaining a computerized system for efficient storage and access to data
- Incorporating a variety of data sources including:
  - ◊ Notifiable disease reports
  - ◊ School absenteeism
  - ◊ Sentinel physician reports
  - ◊ Syndromic data
- Monitoring the occurrence and distribution of infectious disease activity
- Disseminating surveillance data to the public and medical professionals

Communicable diseases are reported to the local health department for investigation in accordance with the Utah Administrative Code (R386-702). Prompt reporting of confirmed and suspect cases helps ensure necessary control and preventive actions. All reports required by rule are confidential and are not open to public inspection.

Entities required to report confirmed or suspected diseases are physicians, hospitals, healthcare facilities, laboratories, schools, long-term care facilities, skilled nursing facilities, and daycares. All case reports should include:

- Disease
- Patient's name
- Patient's address
- Patient's telephone number
- Patient's date of birth
- Pertinent clinical information



# REPORTABLE DISEASES

UTAH LAW REQUIRES THAT THE FOLLOWING DISEASES BE REPORTED TO YOUR LOCAL HEALTH DEPARTMENT OR THE UTAH DEPARTMENT OF HEALTH IMMEDIATELY.

**Davis County Health Department Disease Reporting Line: (801) 525-5220**

- **Anthrax\*** (*Bacillus anthracis*)
- **Botulism\*** (*Clostridium botulinum*)
- **Cholera** (*Vibrio cholerae*)
- **Diphtheria\*** (*Corynebacterium diphtheria*)
- ***Haemophilus influenzae*\***, invasive
- **Hepatitis A**
- **Influenza infection, non-seasonal strain\***
- **Measles\*** (Rubeola virus)
- **Meningococcal disease\*** (*Neisseria meningitidis*)
- **Novel coronavirus disease** including Middle East respiratory syndrome (MERS-CoV), Severe acute respiratory syndrome (SARS-CoV), and COVID-19 (SARS-CoV-2)
- **Plague\*** (*Yersinia pestis*)
- **Poliovirus**, paralytic and non-paralytic
- **Rabies**, human and animal
- **Rubella**
- **Smallpox** (Variola virus)
- ***Staphylococcus aureus*\***, from any clinical specimen with resistance (VRSA) or intermediate resistance (VISA) to vancomycin isolated from any site
- **Transmissible spongiform encephalopathies (prion diseases), including Creutzfeldt-Jakob disease**
- **Tuberculosis\*** (*Mycobacterium tuberculosis*)
- **Tularemia\*** (*Francisella tularensis*)
- **Typhoid\***, cases and carriers
- **Viral hemorrhagic fevers**, e.g. *Ebola*, *Lassa*, *Marburg*, and *Nipah* virus-related illnesses
- **Yellow Fever**
- **Unusual Diseases or Outbreaks of any kind**

UTAH LAW REQUIRES THAT THE FOLLOWING DISEASES BE REPORTED TO YOUR LOCAL HEALTH DEPARTMENT OR THE UTAH DEPARTMENT OF HEALTH WITHIN 3 DAYS AFTER IDENTIFICATION.

**Davis County Health Department Disease Reporting Line: (801) 525-5220  
Or FAX (801) 525-5210**

- ***Acinetobacter* species\*\***
- **Acute Flaccid Myelitis (AFM)**
- **Adverse event resulting after smallpox vaccination** (Vaccinia virus)
- **Anaplasmosis** (*Anaplasma phagocytophilum*)
- **Arbovirus infection**, including Chikungunya, West Nile virus\*, and Zika virus\*
- **Babesiosis** (*Babesia*)
- **Botulism\*** (*Clostridium botulinum*), infant
- **Brucellosis\*** (*Brucella* species)
- **Campylobacteriosis\*** (*Campylobacter*)
- ***Candida auris* or *haemulonii*\*** isolated from any body site
- **Chagas disease**
- **Chancroid** (*Haemophilus ducreyi*)
- **Chickenpox** (Varicella-zoster virus)
- ***Chlamydia trachomatis* infection**
- **Coccidioidomycosis** (*Coccidioides*)
- **Colorado tick fever**
- **Cryptosporidiosis** (*Cryptosporidium*)
- **Cyclosporiasis** (*Cyclospora*)
- **Dengue fever**
- **Ehrlichiosis** (*Ehrlichia*)
- **Encephalitis**, bacterial, fungal, parasitic, protozoan, and viral
- ***Enterobacter* species\*\***
- ***Escherichia coli*\*\***
- **Giardiasis** (*Giardia lamblia*)
- **Gonorrhea**, (*Neisseria gonorrhoeae*) sexually transmitted and ophthalmia neonatorum
- **Hantavirus pulmonary syndrome** (Sin Nombre virus)
- **Hemolytic Uremic Syndrome**, post-diarrheal
- **Hepatitis B**, acute, chronic and perinatal
- **Hepatitis C**, acute, chronic and perinatal
- **Hepatitis**, other viral, including D and E
- **Human immunodeficiency virus (HIV) infection**, including perinatal and acquired immunodeficiency syndrome (AIDS)
- **Influenza-associated hospitalization\***
- **Influenza-associated death in a person less than 18 years of age**
- ***Klebsiella* species\*\***
- **Legionellosis\*** (*Legionella*)
- **Leprosy** (*Mycobacterium leprae*), Hansen's Disease
- **Leptospirosis** (*Leptospira*)
- **Listeriosis\*** (*Listeria monocytogenes*)
- **Lyme disease** (*Borrelia burgdorferi*)
- **Malaria** (*Plasmodium*)
- **Meningitis**, bacterial, fungal, parasitic, protozoan, and viral
- **Mumps**
- ***Mycobacteria* other than tuberculosis\***
- **Norovirus**, outbreaks only
- **Pertussis** (*Bordetella pertussis*)
- **Pregnancy associated with a Hepatitis B, Hepatitis C, HIV, *Listeria*, Rubella, Syphilis, or Zika virus infection**
- ***Pseudomonas aeruginosa*\*\***
- **Psittacosis** (*Chlamydophila psittaci*)
- **Q Fever** (*Coxiella burnetii*)
- **Relapsing fever, tick-borne and louse-borne** (*Borrelia*)
- **Rubella**, including congenital syndrome
- **Salmonellosis\*** (*Salmonella*)
- **Shiga toxin-producing *Escherichia coli* (STEC) infection\***
- **Shigellosis\*** (*Shigella*)
- **Spotted fever rickettsioses, including Rocky Mountain spotted fever** (*Rickettsia*)
- **Streptococcal disease due to *Streptococcus pneumoniae* and Groups A and B**
- **Syphilis**, all stages, congenital, and syphilitic stillbirths
- **Tetanus** (*Clostridium tetani*)
- **Toxic-Shock Syndrome**, staphylococcal or streptococcal
- **Trichinellosis** (*Trichinella*)
- **Vibriosis\*** (*Vibrio*)

## REPORTABLE DISEASES THROUGH ELECTRONIC LABORATORY REPORTING (ELR) FOR PARTICIPATING LABORATORIES AND HOSPITALS

- ***Clostridium difficile***
- **Cytomegalovirus (CMV)**, congenital
- **Respiratory syncytial virus (RSV)**
- **Streptococcal disease**, invasive, other

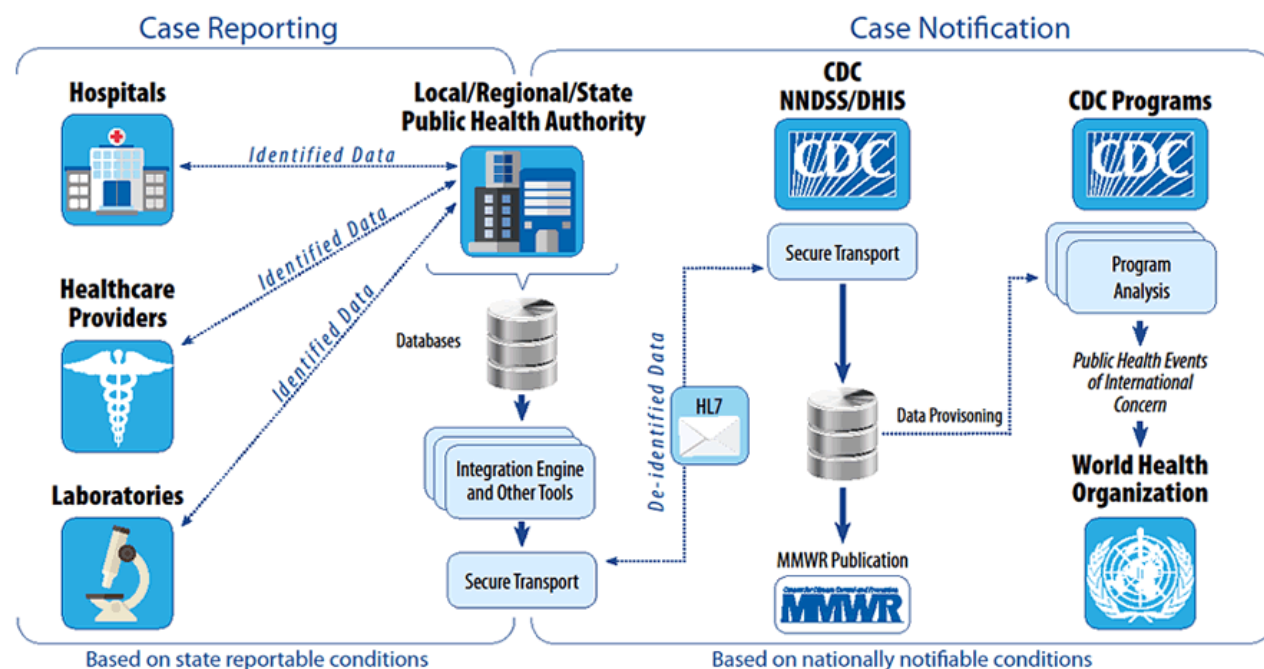
\*Laboratories shall submit isolates of causative agents, or if an isolate is not available, clinical material, to the Utah Public Health Laboratory for these diseases/conditions, including any organism implicated in an outbreak when instructed by authorized local or state health department staff.

\*\*Includes any clinical specimen, that is resistant to at least one carbapenem-class antibiotic, or that has demonstrated carbapenemase production.

Diseases may be reported to Davis County Health Department by fax (801-525-5210) or telephone (801-525-5220). For questions about disease reporting, please contact Brandon Beagles by phone (801-525-5148) or by email ([bbeagles@co.davis.ut.us](mailto:bbeagles@co.davis.ut.us)) or visit <http://www.co.davis.ut.us/health/health-services/disease-control-services/healthcare-professionals-medical-providers>

Disease surveillance data received from several reporting sources (including hospitals, clinics, and laboratories) is used to complete case investigations and minimize the spread of infectious disease (see Figure 1). Data retrieved during investigations of reported infectious disease cases is maintained in UT-NEDSS/EpiTrax—a secure, online database that allows epidemiologists and infectious disease investigators to access case information statewide. De-identified data is then shared with the Centers for Disease Control and Prevention (CDC) to meet additional reporting requirements and identify outbreaks.

Figure 1. National Notifiable Disease Surveillance System Data Flow

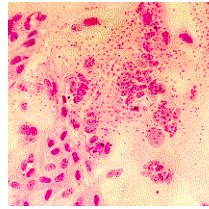
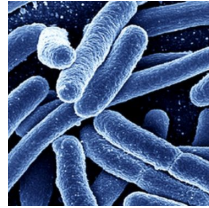
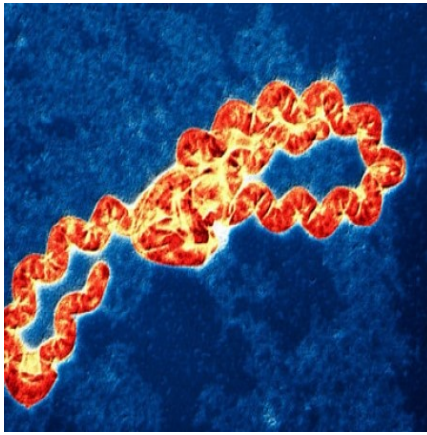


Data acquired for cases reported during 2021 were exported into Microsoft Excel (2013) for further analysis. Descriptive statistics were also calculated in Microsoft Excel (2013).

The most current available data estimates (2020) were used for city populations for 2021 report. These estimates were obtained from the U.S. Census Bureau's American Fact Finder at <http://factfinder.census.gov> in January 2022.

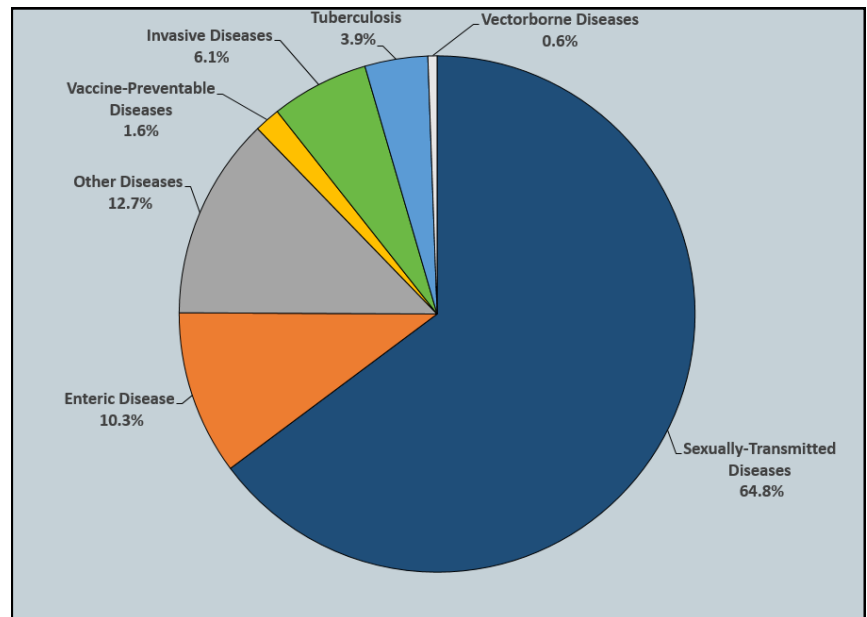
Population estimates by age group, gender, race, and ethnicity were available for 2020. These estimates were retrieved in January 2022 from the Utah Department of Health's (UDOH) Indicator-Based Information System for Public Health (IBIS-PH) available at <http://ibis.health.utah.gov>.

All incidence rates were calculated in Microsoft Excel (2013) and are expressed as the number of cases reported in 2021, respectively, per 100,000 people. The incidence rates of all STDs by city were similarly calculated, after controlling for age. This was done to account for the increased prevalence of STDs among the young adult population.



# Reportable Disease Summary

**Figure 2. Diseases Reported by Type, Davis County, 2021**



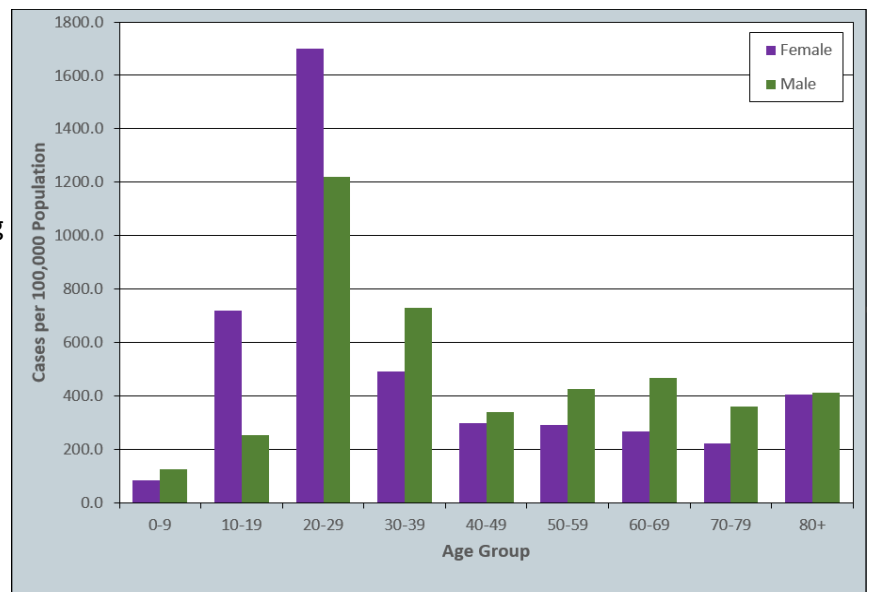
Disease morbidity and mortality have decreased over the past century, partly due to the partnership between private and public health care. Unfortunately, new and emerging diseases are surfacing, requiring additional efforts from both the medical community and public health. Existing pathogens are also increasing as population grows. Disease affects all races, ethnicities, ages, and genders.

Excluding COVID-19, Davis County Health Department (DCHD) received a total of **1,926** disease reports during 2021, 3.0% more than the 1,869 disease reports received in 2020.

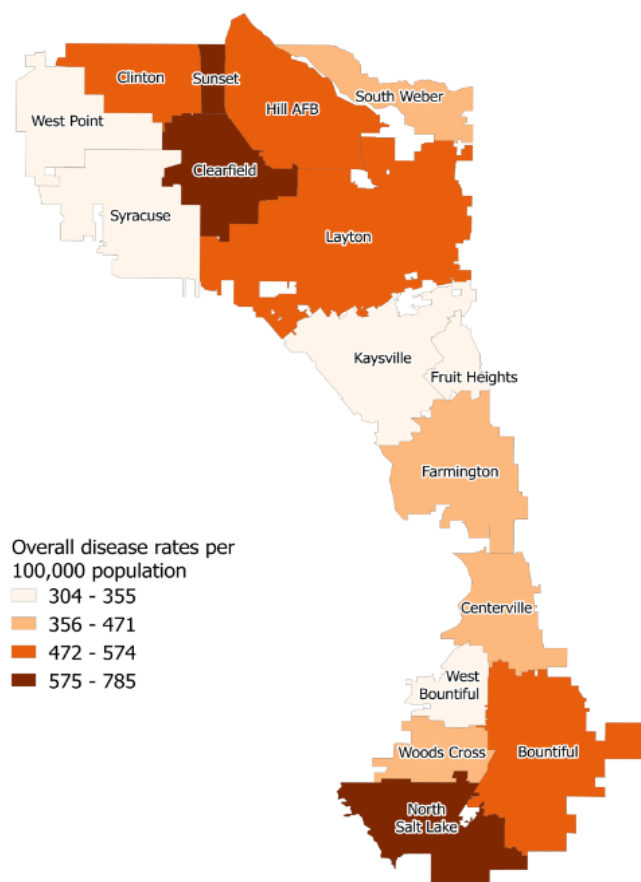
Over half (64.8%) of the diseases reported were sexually transmitted diseases, followed by other diseases (12.7%), enteric diseases (10.3%), invasive diseases (6.1%), tuberculosis infections (3.9%), vaccine-preventable diseases (1.6%), and vector-borne/zoonotic diseases (0.6%) (see Figure 2).

Cases were reported slightly more often among females (52.2%) than males (47.8%). The age group 20-29 years old have the highest rate of infection (see Figure 3). This age group is known for having more sexual activity.

**Figure 3. Disease Reports by Age Group and Gender, Davis County, 2021**



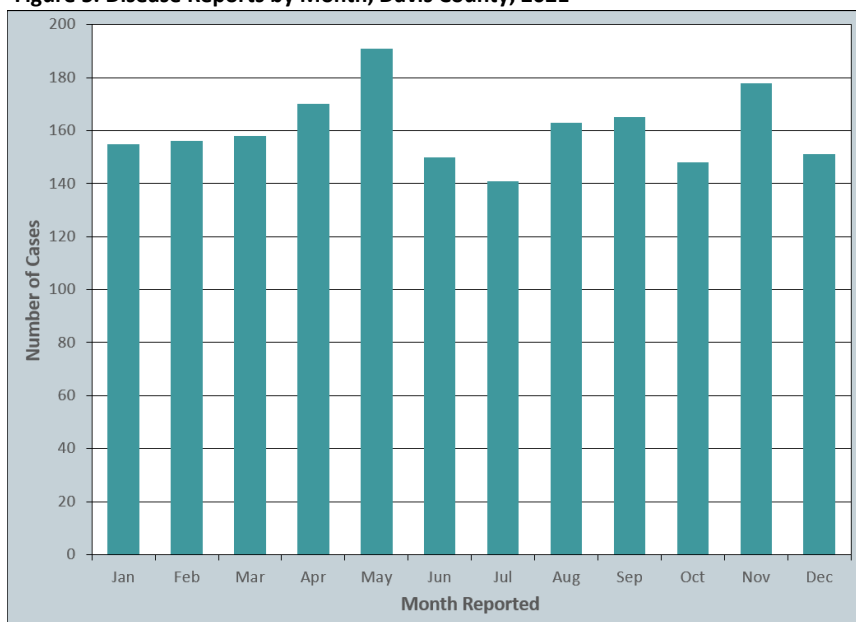
**Figure 4. Incidence of All Reportable Diseases, Davis County, 2021**



Disease rates by city are identified by the place of residence of the affected individual at the time of diagnosis. These rates do not suggest that one city is better or worse than another, but simply describe the disease burden in each city (see Figure 4).

Tuberculosis data are not included because most infections were acquired outside of Davis County. Sunset, Clearfield, and North Salt Lake had the highest rates of all reportable diseases (excluding COVID-19) among all cities, whereas West Point, Syracuse, Kaysville, Fruit Heights, and West Bountiful had the lowest rates.

**Figure 5. Disease Reports by Month, Davis County, 2021**



The disease burden in Davis County normally stays consistent throughout the year (see Figure 5). May 2021 had the highest number of reported diseases. This is most likely due to the increase in reported chlamydia cases in May. In 2021, an average of 160.5 diseases were reported each month.

## Top 20 Diseases

Table 1. Frequently Occurring Diseases in Davis County, 2021

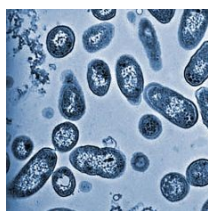
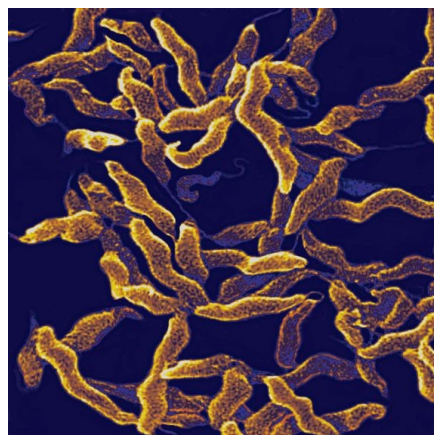
Rank	Disease	Number of Cases
1	Novel Coronavirus (COVID-19)	41,079
2	<i>Chlamydia trachomatis</i> infection	940
3	Gonorrhea	260
4	Hepatitis C, acute & chronic	127
5	Invasive Streptococcal Infections	107
6	Carbapenem-Resistant Enterobacteriaceae (CRE)	104
7	Tuberculosis, Latent Infection (LTBI)	74
8	Campylobacteriosis	48
9	Syphilis, all stages	36
9	Norovirus	36
11	Shiga toxin-producing <i>Escherichia coli</i> (STEC)	33
12	Salmonellosis	31
13	Cryptosporidiosis	20
13	Giardiasis	20
15	HIV Infection, adult	12
16	Hepatitis B, acute & chronic	11
17	Coccidioidomycosis	10
18	Chickenpox (Varicella)	9
18	West Nile virus infection	9
20	Pertussis	7



# Diseases Reported by Year, 2016 - 2021

Table 2. Diseases Reported by Year, Davis County, 2016 - 2021

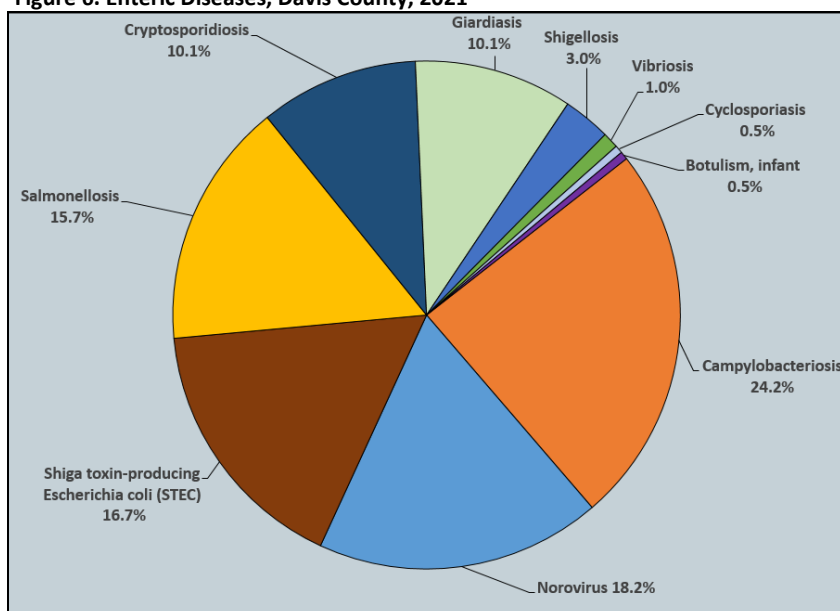
Disease	2016	2017	2018	2019	2020	2021	5 Yr Ave (2016-20)
Amebiasis	0	0	0	0	0	0	0.0
Brucellosis	0	0	0	1	0	0	0.2
Botulism, infant	0	0	0	0	1	1	0.2
Botulism, wound	0	0	0	0	0	1	0.0
Campylobacteriosis	41	59	46	50	46	48	48.4
Carbapenem-Resistant Enterobacteriaceae (CRE)	14	19	12	86	73	104	40.8
Chickenpox	23	26	24	13	9	9	19.0
Chikungunya	1	0	1	0	0	0	0.4
Chlamydia	934	1,094	1,158	1,160	954	940	1,060.0
Coccidioidomycosis	7	5	3	15	6	10	7.2
Colorado Tick Fever	0	0	0	0	0	1	0.0
Coronavirus, Novel (COVID-19)	-	-	-	-	25,297	41,079	-
Creutzfeldt-Jakob Disease (CJD)	0	1	1	0	0	0	0.4
Cryptosporidiosis	27	11	9	15	14	20	15.2
Cyclosporiasis	1	3	2	2	1	1	1.8
Dengue Fever	0	2	1	1	0	0	0.8
E-cigarette or vaping use-associated lung injury (EVALI)	-	-	-	13	0	0	-
Encephalitis	1	0	1	1	3	0	1.2
Giardiasis	27	18	22	20	15	20	20.4
Gonorrhea	129	171	223	229	238	260	198.0
<i>H. influenzae</i> , invasive disease	6	5	4	7	4	3	5.2
Hansen's disease (Leprosy)	0	1	0	0	0	1	0.2
Hantavirus Pulmonary Syndrome (HPS)	1	0	0	0	0	0	0.2
Hepatitis A	1	4	6	1	0	1	2.4
Hepatitis B, acute & chronic	34	34	23	22	19	11	26.4
Hepatitis C, acute & chronic	166	130	118	97	101	127	122.4
Hepatitis C, perinatal	0	0	0	0	0	1	0.0
Hepatitis E	0	0	0	0	0	0	0.0
HIV/AIDS	7	14	12	11	8	12	10.4
Influenza, hospitalized	133	122	178	171	115	3	143.8
Legionellosis	1	4	3	3	3	1	2.8
Leptospirosis	0	0	1	1	0	0	0.4
Listeriosis	1	0	0	0	1	0	0.4
Lyme disease	2	9	1	7	3	0	4.4
Malaria	0	0	2	0	0	1	0.4
Meningitis, aseptic/viral	7	24	30	19	1	5	16.2
Meningitis, bacterial & other	0	6	4	6	1	3	3.4
Meningococcal disease	0	0	0	0	0	0	0.0
Mumps	1	2	3	3	0	0	1.8
Norovirus	69	26	35	157	7	36	58.8
Pertussis	24	37	37	22	16	7	27.2
Q fever, chronic	0	0	1	1	0	0	0.4
Salmonellosis	42	41	40	36	38	31	39.4
Shiga toxin-producing <i>E. coli</i> (STEC)	11	13	18	12	17	33	14.2
Shigellosis	9	3	4	7	3	6	5.2
Spotted Fever Rickettsiosis	1	2	3	1	1	0	1.6
Streptococcal disease, invasive	91	103	92	84	86	107	91.2
Syphilis – all stages	19	23	36	42	24	36	28.8
Tuberculosis, active disease	2	3	0	3	6	1	2.8
Tuberculosis, latent infection	112	102	163	91	51	74	103.8
Vibriosis	0	2	1	2	0	2	1.0
West Nile virus infection	0	8	0	5	2	9	3.0
Zika virus	2	1	1	1	1	0	1.2
<b>Total</b>	<b>1,947</b>	<b>2,128</b>	<b>2,319</b>	<b>2,418</b>	<b>27,165</b>	<b>43,061</b>	<b>7,195.4</b>



# Enteric Diseases

Enteric infections enter the body through the mouth and intestinal tract and are usually spread through contaminated food and water or by contact with vomit or feces.

Figure 6. Enteric Diseases, Davis County, 2021

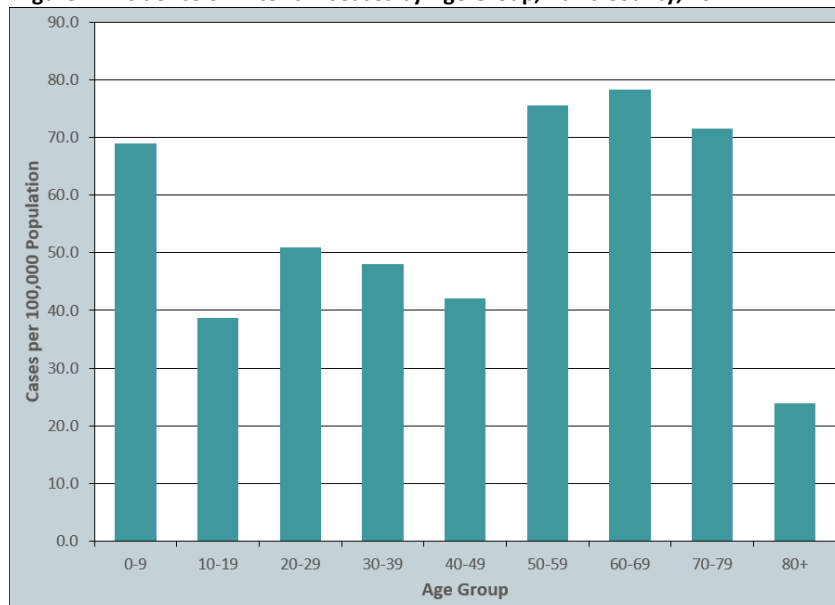


Enteric diseases are caused by bacterial, viral, or parasitic organisms that are shed in feces and can be spread person-to-person or through contaminated food and water. Enteric diseases are generally characterized by gastrointestinal symptoms such as nausea, vomiting, and diarrhea.

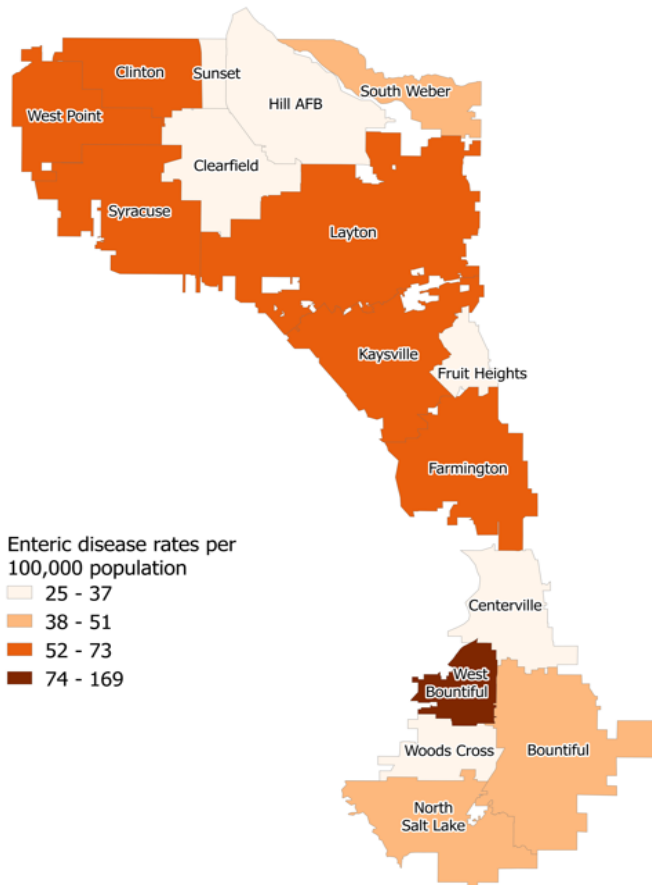
There were **198** enteric disease cases reported during 2021. Campylobacteriosis was the most frequently reported enteric disease with **48** cases (24.2%), followed by norovirus with **36** cases (18.2%), Shiga toxin-producing *E. coli* (STEC) with **33** cases (16.7%), salmonellosis with **31** cases (15.7%), cryptosporidiosis and giardiasis with **20** cases each (10.1%), shigellosis with **six** cases (3.0%), vibriosis with **two** cases (1.0%), and cyclosporiasis and infant botulism each with **one** case (0.5%) (see Figure 6).

Enteric illnesses are highest among those between 60-69 years of age (see Figure 7). Enteric illnesses are typically more common among the elderly and other susceptible groups, including children and the immunocompromised.

Figure 7. Incidence of Enteric Diseases by Age Group, Davis County, 2021

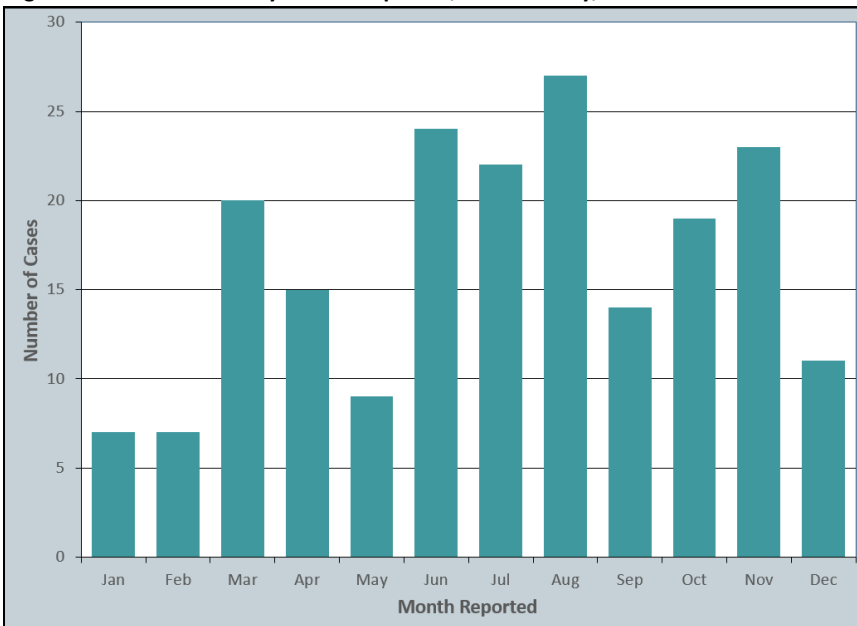


**Figure 8. Incidence of Enteric Diseases by City, Davis County, 2021**



In 2021, enteric diseases were reported among residents of every city within Davis County. While the rates by city varied, the overall incidence rate of enteric diseases in Davis County during 2021 was 54.7 per 100,000 residents. In 2021, West Bountiful had the highest rate of enteric illnesses, whereas Sunset, Hill Air Force Base, Clearfield, Fruit Heights, Centerville, and Woods Cross had the lowest (see Figure 8).

**Figure 9. Enteric Disease by Month Reported, Davis County, 2021**



Enteric diseases are reported year-round, but higher incidence rates usually take place in the summer months (see Figure 9). In 2021, August had the highest case count, which could be in part due to multiple outbreaks of enteric diseases, including salmonellosis, STEC, and campylobacteriosis.

# Campylobacteriosis

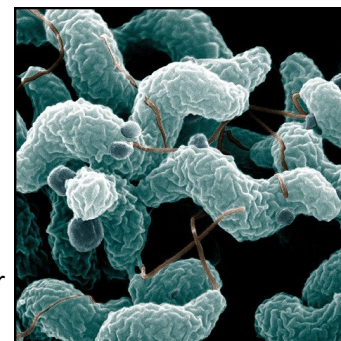
## Overview

There were **48** cases of *Campylobacter* infection reported in Davis County in 2021.

One outbreak of *Campylobacter* infection was investigated in Davis County in 2021.

On average, Davis County has had lower rates of *Campylobacter* infection when compared to Utah.

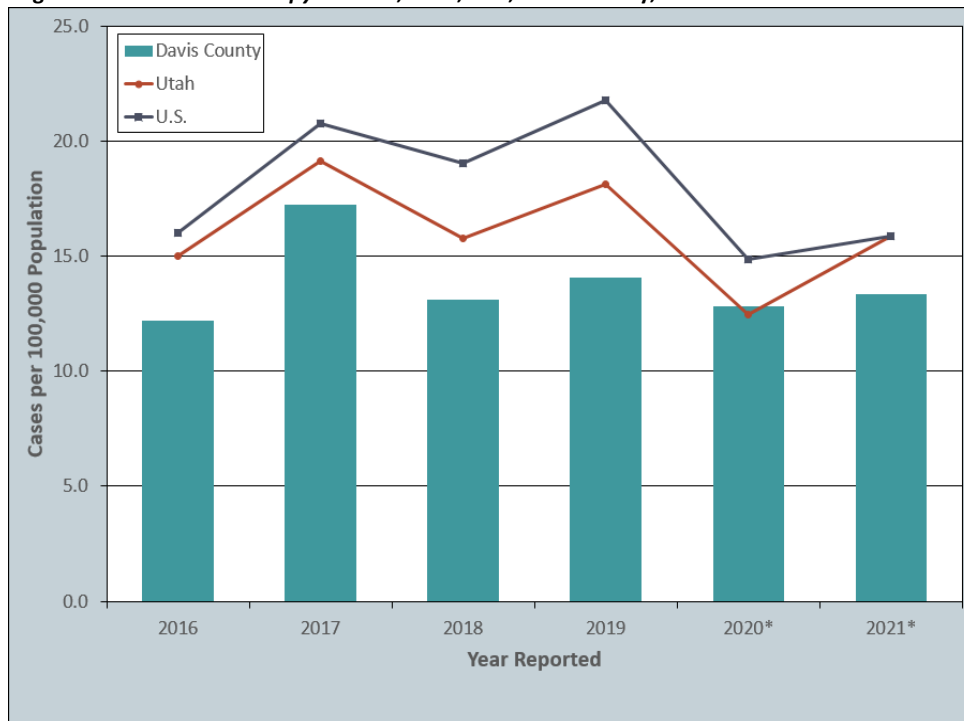
Campylobacteriosis is an infectious disease caused by bacteria of the genus *Campylobacter*. The bacteria are transmitted via the fecal-oral route. Improperly cooked poultry, untreated water, and unpasteurized milk are the most common sources of infection. *Campylobacter* is one of the most common bacterial causes of diarrheal illness in the United States. Virtually all cases occur as isolated or sporadic events and are not usually associated with an outbreak. Active surveillance through the CDC indicates that about 20 cases are diagnosed each year for every 100,000 persons in the population. Many more cases go undiagnosed or unreported, and campylobacteriosis is estimated to affect over 1.5 million persons every year.



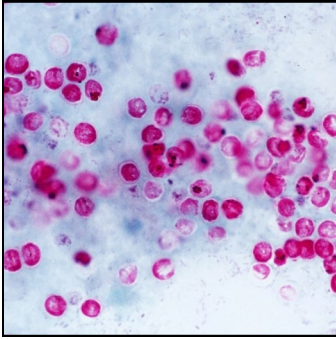
*Campylobacter*, one of the most common bacterial causes of diarrheal illness in the United States.

During 2021, there were **48** cases of campylobacteriosis reported (Figure 10). This is a 4.3% increase from the 46 cases reported in 2020. One outbreak of campylobacteriosis was investigated during 2021. This outbreak occurred at a private event, infecting one Davis County resident and five other individuals outside of Davis County. When compared with the state of Utah and the United States, Davis County on average has lower rates of campylobacteriosis.

Figure 10. Incidence of *Campylobacter*, Utah, U.S., Davis County, 2016-2021



\*Utah and United States 2020 and 2021 data are provisional.



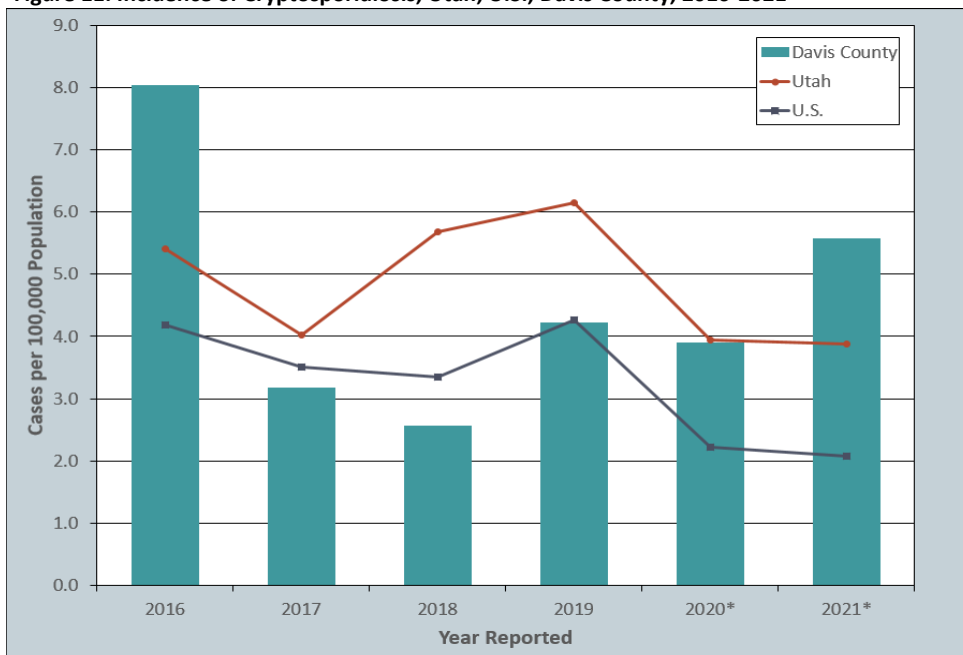
This micrograph of a direct fecal smear is stained to detect *Cryptosporidium*, a protozoan parasite.

Cryptosporidiosis is an infection caused by the protozoan organism *Cryptosporidium parvum*. *Cryptosporidia* have been found in many hosts, including humans, cattle and other domestic mammals. Infections may occur via person-to-person, fecal-oral, animal-to-person, or waterborne transmission. During the past two decades, cryptosporidiosis has become recognized as one of the most common causes of waterborne disease in humans in the United States. The parasite may be found in drinking water and recreational water in every region of the United States and throughout the world.

During 2021, Davis County had **20** cases of cryptosporidiosis — a 42.9% increase from 2020 when 14 cases were reported (see Figure 11). One outbreak was identified in 2021, occurring at a daycare within Davis County. This outbreak infected a total of nine individuals. Common exposures reported by cases included animal exposure, recreational water exposure, international travel, and sexual exposure.

In 2021, Davis County had higher rates of cryptosporidiosis when compared to Utah and the United States (see Figure 11). In 2007, Utah experienced one of the largest cryptosporidiosis outbreaks in the United States with over 3,500 cases statewide, including nearly 300 in Davis County. These cases were largely associated with public swimming pools. Since that time, cases have greatly diminished due to the implementation of new control measures, including installation of ultraviolet (UV) light filters in several Davis County pool systems and effective public service announcements.

**Figure 11. Incidence of Cryptosporidiosis, Utah, U.S., Davis County, 2016-2021**



\*Utah and United States 2020 and 2021 data are provisional.

## Overview

There were 20 cases of cryptosporidiosis reported in Davis County in 2021.

One outbreak of cryptosporidiosis was identified in Davis County in 2021.

In 2021, Davis County experienced a higher rate of cryptosporidiosis when compared to Utah and the United States.



# Giardiasis

## Overview

There were 20 cases of giardiasis reported in Davis County in 2021.

Common exposures include recreational water, outdoor activities, and international travel.

Historically, when compared to the state of Utah, Davis County typically has a lower rate of giardiasis.

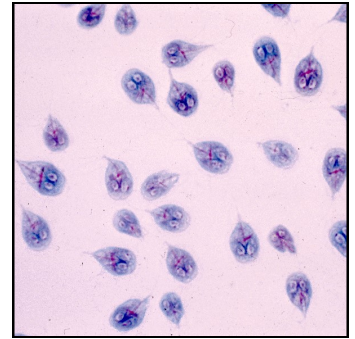
Giardiasis is caused by *Giardia lamblia*, a microscopic parasite that causes diarrheal illness. *Giardia* is found on surfaces or in soil, food, or water that has been contaminated with fecal matter from infected humans or animals. Humans and other mammals (especially beavers, dogs, and cats) are reservoirs and shed the organism in their stool.

*Giardia* is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it tolerant to chlorine disinfection. While the parasite can be spread in different ways, water (either drinking or recreational) is the most common mode of transmission.

Persons with giardiasis are infectious to others for the entire period of their illness, which can be weeks or months. Severity of disease varies from no symptoms to chronic diarrhea. Giardiasis tends to have intermittent symptoms, thus individuals may seek medical attention months after the initial infection occurred.

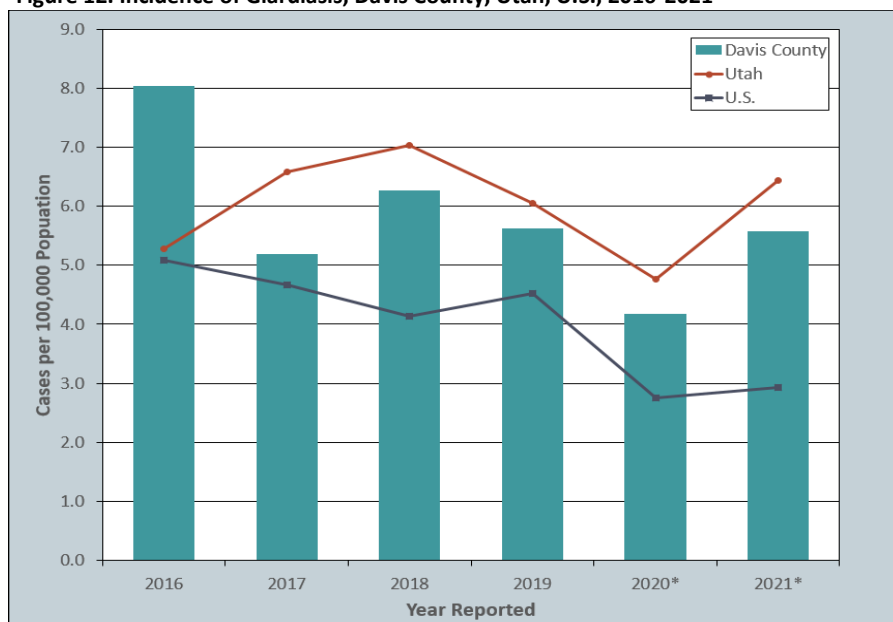
During 2021, there were **20** cases of giardiasis reported in Davis County, a 33.3% increase from the 15 cases reported in 2020 (see Figure 12). No outbreaks of giardiasis were investigated in Davis County during 2021. Common exposures reported by cases included recreational water, outdoor activities, and international travel.

When compared to the state of Utah, Davis County traditionally has lower rates of giardiasis. Davis County Health Department continues to conduct disease surveillance to identify cases and/or clusters, determine the source of infection, and prevent further transmission.



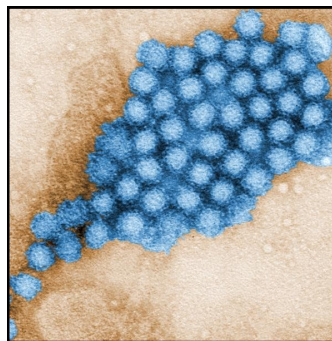
*Giardia* is a microscopic parasite that causes the diarrheal illness known as giardiasis.

Figure 12. Incidence of Giardiasis, Davis County, Utah, U.S., 2016-2021



\*Utah and United States 2020 and 2021 data are provisional.

Noroviruses are named after the original strain “Norwalk virus,” which caused an outbreak of gastroenteritis in a school in Norwalk, Ohio, in 1968. There are at least five known norovirus geno-groups, which in turn are divided into at least 31 genetic clusters. Noroviruses are transmitted primarily through the fecal-oral route, by consumption of fecal-contaminated food/water or by direct person-to-person contact. Environmental and fomite contamination are also sources of infection. Evidence exists of transmission via aerosolization of vomitus resulting in droplets contaminating surfaces or entering the oral mucosa and then swallowed. No evidence suggests that infection occurs through the respiratory route. The CDC estimates that 19-21 million cases of acute gastroenteritis due to norovirus infection occur each year. Norovirus is the leading cause of foodborne illness in the United States and is responsible for about 50% of foodborne disease outbreaks due to known agents.



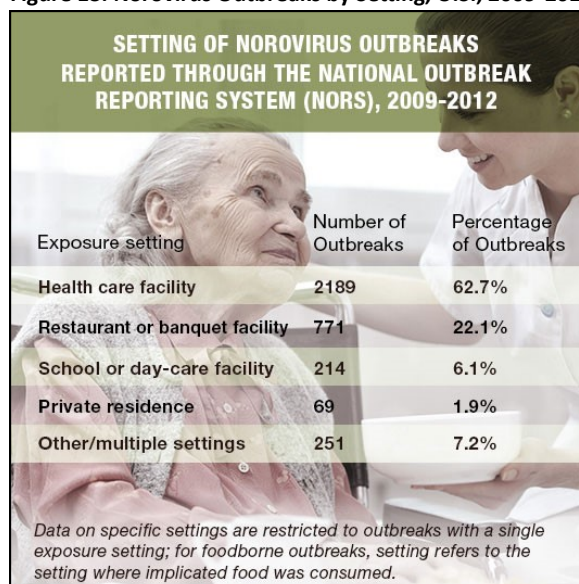
Norovirus is a very contagious virus. Norovirus can be spread from an infected person, contaminated food or water or by touching contaminated surfaces.

Due to the short duration of illness (typically 24 hours) and the self-limited, mild-to-moderate manifestation, persons infected with norovirus often do not seek medical care. Those who do are rarely tested for norovirus because testing is not widely available. As a result, many outbreaks are not identified. When suspect cases are reported to the health department, they are often received after the patient has recovered or late into the illness, making it difficult to confirm a diagnosis.

During 2021, there were **36** cases of norovirus reported in Davis County residents. This is a 414.3% increase from 2020, when there were seven cases reported. One outbreak was investigated in 2021, which occurred at a local restaurant. DCHD worked with the local restaurant to investigate the outbreak.

Environmental Health inspected the facility and worked with the restaurant's management to test several employees for foodborne illness. Two employees tested positive for norovirus. As a result, the restaurant completed a thorough cleaning and disinfection process, in addition to restricting the ill workers from reporting to work until their symptoms had resolved. No other cases or complaints were reported. Although norovirus can be found in restaurant settings, it is most commonly found in health care facilities and congregate living facilities (see Figure 13).

**Figure 13. Norovirus Outbreaks by Setting, U.S., 2009-2012**



## Overview

A total of **36** cases of norovirus were reported in Davis County during 2021.

One outbreak of norovirus was identified in Davis County in 2021.

Norovirus is most commonly found in health care facilities and congregate living facilities.

# Salmonellosis

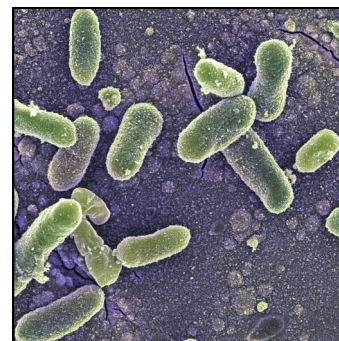
## Overview

There were 31 cases of salmonellosis reported in Davis County in 2021.

There were four known outbreaks of salmonellosis in Davis County in 2021.

Davis County traditionally has lower rates of salmonellosis when compared to the United States.

Salmonellosis is a bacterial infection generally transmitted through ingestion of contaminated food or water. Salmonellosis can also be transmitted by direct contact with an infected human or animal. *Salmonella* bacteria are commonly found in food products and can be carried by many domestic animals. CDC estimates that approximately 1.35 million illnesses due to salmonellosis occur in the United States every year and is more common in summer than in winter. Young children, the elderly, and those who are immunocompromised are most likely to have severe infections. It is estimated that approximately 420 persons die each year from salmonellosis.



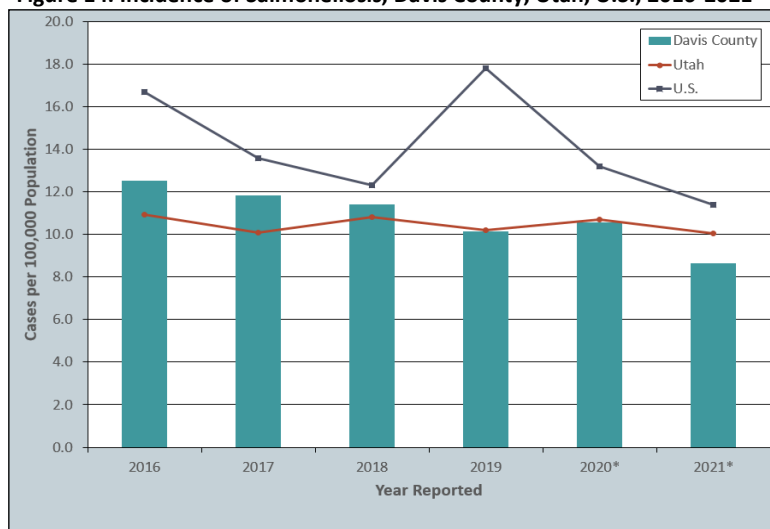
*Salmonella* is a bacteria that was discovered by an American scientist named Dr. Salmon and has been known to cause illness for over 125 years.

During 2021, there were **31** cases of salmonellosis reported in Davis County, a 18.4% decrease from the 38 cases reported in 2020 (see Figure 14). There were four known outbreaks of salmonellosis in Davis County in 2021.

Because of the many different strains of *Salmonella*, determining the serotype and Whole Genome Sequencing (WGS) pattern of *Salmonella* isolates is critical in identifying sources and epidemiological links among cases. Serotypes are conventionally named after the city where they were discovered. Private laboratories are required to submit *Salmonella* isolates to the Utah Public Health Laboratory (UPHL) for serotyping and WGS analysis. WGS patterns are compared with other Utah and U.S. *Salmonella* isolates to identify possible clusters and suspect sources.

*Salmonella* Newport was the most commonly reported *Salmonella* serotype during 2021. *Salmonella* Infantis and *Salmonella* Enteritidis were also among the most common serotypes in Davis County. Additional serotypes were reported in 2021, but were not as common (see Table 3).

Figure 14. Incidence of Salmonellosis, Davis County, Utah, U.S., 2016-2021



\*Utah and United States 2020 and 2021 data are provisional.

**Table 3. Salmonella by type, Serotypes, Davis County, 2021**

Serotype	Number of Cases(%)
<i>Salmonella</i> Newport	5(16%)
<i>Salmonella</i> Infantis	4(13%)
<i>Salmonella</i> Enteritidis	3(10%)
<i>Salmonella</i> Braenderup	2(6%)
<i>Salmonella</i> Javiana	2(6%)
<i>Salmonella</i> Hadar	2(6%)
<i>Salmonella</i> Saintpaul	2(6%)
<i>Salmonella</i> Typhimurium	1(3%)
<i>Salmonella</i> Urbana	1(3%)
<i>Salmonella</i> Sandiego	1(3%)
<i>Salmonella</i> Thompson	1(3%)
<i>Salmonella</i> I3:10:l:z13:e:n:z15	1(3%)
<i>Salmonella</i> Oranienberg	1(3%)
<i>Salmonella</i> Seroovar	1(3%)
<i>Salmonella</i> Brandenburg	1(3%)
<i>Salmonella</i> Poona	1(3%)
<i>Salmonella</i> Paratyphi B	1(3%)
Unknown	1(3%)
<b>Total</b>	<b>31(100%)</b>

Several outbreaks of salmonellosis were investigated in Davis County and Utah during 2021.

#### ***Salmonella* Brandenburg**

DCHD investigated one case of *Salmonella* Brandenburg that was part of a multistate outbreak across five states, with a total of 49 cases. CDC was unable to link these infections with a specific food product. Notable exposures for the *Salmonella* Brandenburg outbreak included bacon, eggs, rotisserie chicken, beef, apples, and peppers.

#### ***Salmonella* Hadar**

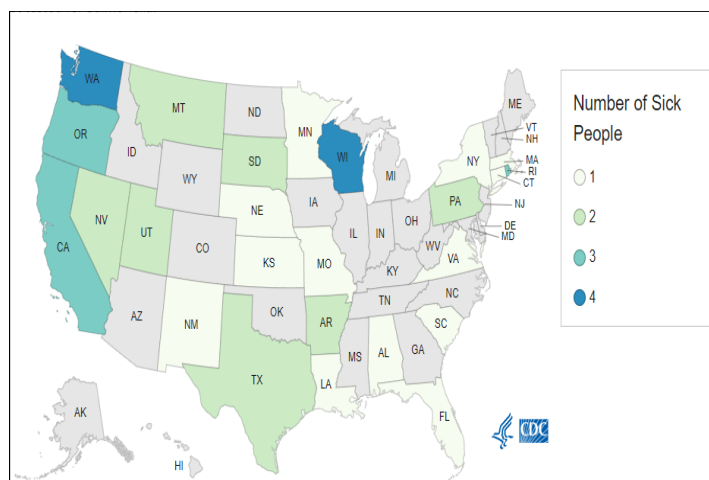
DCHD investigated two cases of *Salmonella* Hadar associated with backyard poultry. During 2021, *Salmonella* infections related to backyard poultry occurred in 48 states, with a total of 1,135 cases, 273 hospitalizations, and two deaths. Utah had a total of 12 cases.

#### ***Salmonella* Infections linked to bearded dragons**

CDC investigated a multistate outbreak of *Salmonella* infections linked to bearded dragons starting in December 2020. As of January 2022, 44 people from 25 states were infected, with a total of 15 hospitalizations. Davis County investigated one case linked to this national outbreak (*Salmonella* I3:10:l:z13:e:n:z15), with a total of two cases in Utah (see Figure 15).

#### ***Salmonella* Infections linked to onions**

*Salmonella* outbreaks of various strains continue to be associated with onions across the United States. Numbers of associated cases continued to climb nationwide in 2021. As of November 2021, 892 people from 38 states (and Puerto Rico) were infected, with a total of 183 hospitalizations. Davis County had one case associated with this national outbreak (*Salmonella* Oranienberg), and Utah has had a total of three cases.

**Figure 15. Salmonella outbreak linked to bearded dragons in the U.S., 2021**



# Shiga Toxin-Producing *Escherichia coli* Infection

## Overview

There were **33** cases of STEC infection reported in Davis County in 2021.

The most common strain reported in Davis County was **O157:H7**.

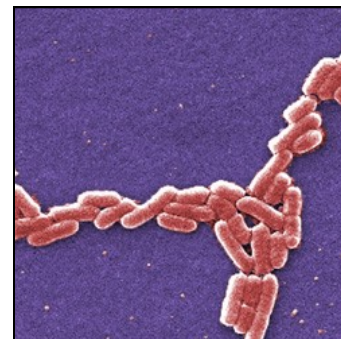
There were multiple national outbreaks linked to the **O157:H7** strain in 2021.

*Escherichia coli* (*E. coli*) are bacteria that normally live in the intestines of humans and animals. Certain strains of *E. coli*, including O121, O11, O26, and O157:H7 produce Shiga toxins that can cause hemorrhagic colitis, manifested as bloody stools. The most serious complication of the infection is Hemolytic Uremic Syndrome (HUS), which can lead to permanent kidney damage or death.

Sources of transmission include consumption of undercooked, contaminated ground beef and other beef products, unpasteurized milk, drinking or swimming in water that is contaminated with sewage, or eating unwashed fruits or vegetables. Person-to-person transmission can easily occur within households, childcare centers, and long-term care facilities. Due to the potential severity of Shiga toxin-producing *E. coli* (STEC) and the fact that it spreads easily, public health investigates all reported cases thoroughly.

In 2021, there were **33** cases of STEC infection reported in Davis County, an increase of 94.1% from the 17 cases reported in 2020 (see Figure 16). The most common known strain reported in Davis County in 2021 was O157:H7 (eight cases). There were also other common strains identified in 2021 (see Table 4).

In 2021, there were multiple national outbreaks linked to STEC serotype O157:H7 strain. These outbreaks included packaged salads, baby spinach, cake mix, and several unknown sources.

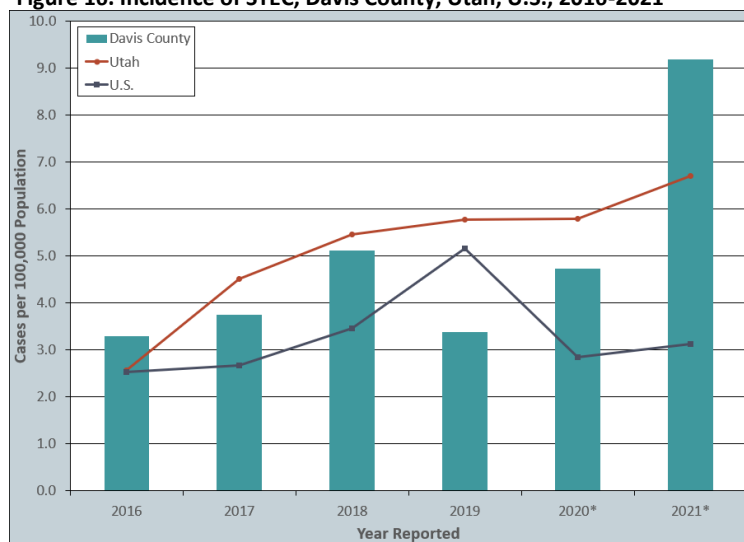


*E. coli* bacteria normally live in the intestines of people and animals. Most *E. coli* are harmless and actually are an important part of a healthy human intestinal tract.

Table 4. Shiga Toxin-Producing *E. coli* Serotypes, Davis County, 2021

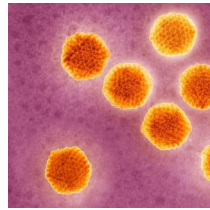
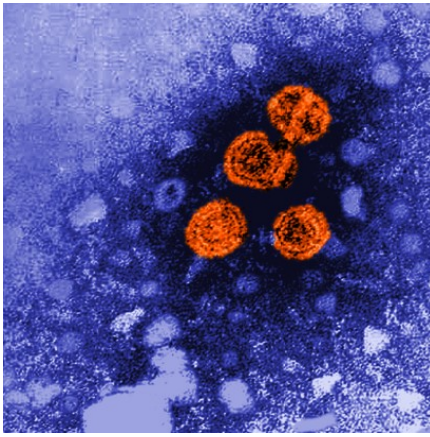
Serotype	Number of Cases (%)
Unknown	10(30%)
Escherichia coli O157:H7	8(24%)
Escherichia coli O111:H8	3(9%)
Escherichia coli O157	2(6%)
Escherichia coli O121:H19	2(6%)
Escherichia coli O26:H11	2(6%)
Escherichia coli O157:non-motile	2(6%)
Escherichia coli O103:H2	1(3%)
Escherichia coli O5	1(3%)
Escherichia coli O151:H16	1(3%)
O157	1(3%)
<b>Total</b>	<b>33 (100%)</b>

Figure 16. Incidence of STEC, Davis County, Utah, U.S., 2016-2021



\*Utah and United States 2020 and 2021 data are provisional.





# Vaccine-Preventable Diseases

Vaccine-preventable diseases are infectious diseases for which an effective preventive vaccine exists.

Vaccine-Preventable Diseases (VPDs) are diseases that are preventable through the use of immunizations. Historically, children had high rates of morbidity and mortality from VPDs. Rates of VPDs have dramatically declined in large part because of immunizations. These diseases still occur, however, because of importation, vaccine failure or disease breakthrough, and incomplete or no vaccinations.

When a VPD is diagnosed, it is important that public health measures be quickly implemented to contain the spread. These measures include the administration of prophylactic medications and vaccines, isolation of the infected individual, quarantine of exposed individuals, and public education.

In 2021, hepatitis B was the most commonly reported VPD with **11** cases (35.5%), followed by chickenpox with **nine** cases (29.0%), pertussis with **seven** cases (22.6%), influenza-associated hospitalizations with **three** cases (9.7%), and hepatitis A with **one** case (3.2%)(see Figure 17). Individuals with the highest rates of VPDS were between the ages of 50—59 years old (see Figure 18).

Figure 17. VPDs, Davis County, 2021

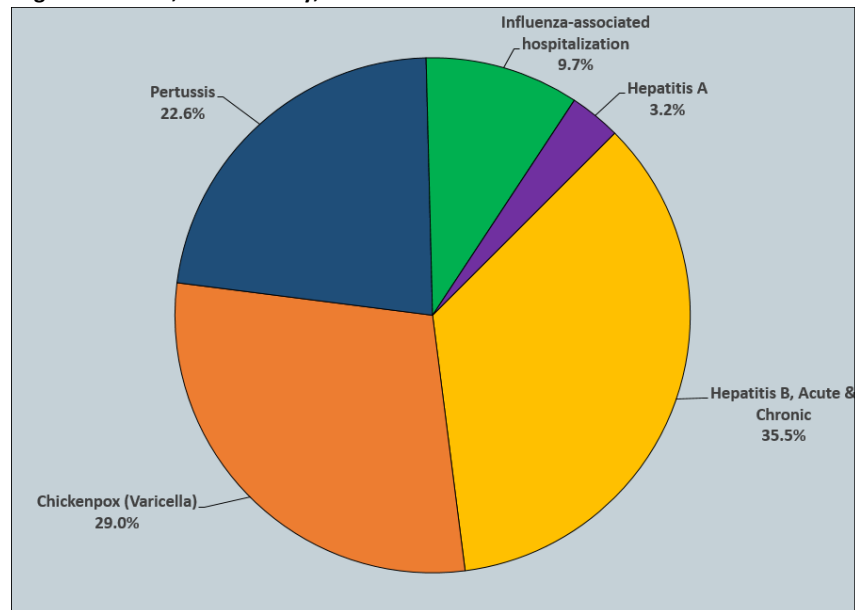
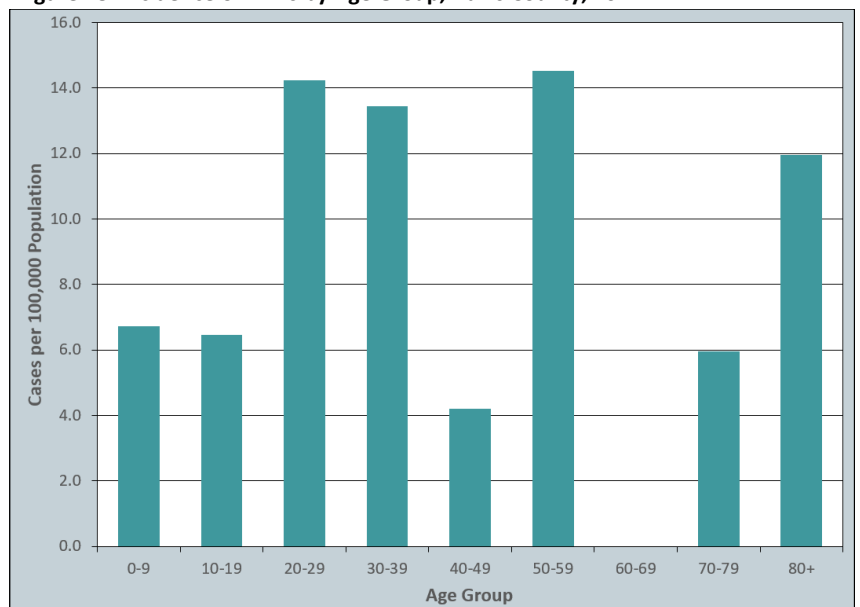
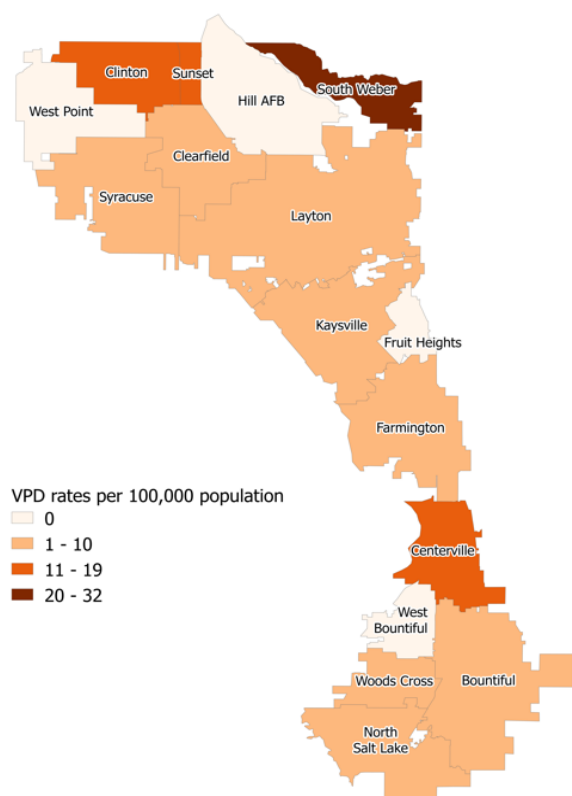


Figure 18. Incidence of VPDs by Age Group, Davis County, 2021



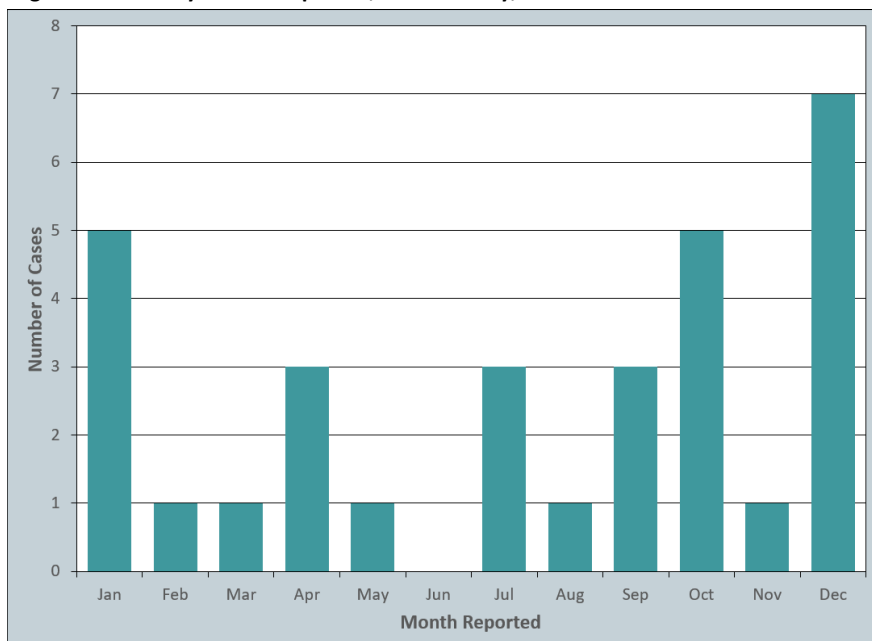
# Vaccine-Preventable Diseases

**Figure 19. Incidence of VPDs by City, Davis County, 2021**



In 2021, VPDs occurred among residents in the majority of the cities throughout the county (see Figure 19). The city with the highest incidence rate was South Weber. The city with the lowest incidence rates were Fruit Heights, Hill Air Force Base, West Bountiful, and West Point. The incidence rate of VPDs in Davis County through 2021 was 8.6 cases per 100,000 residents.

**Figure 20. VPDs by Month Reported, Davis County, 2021**

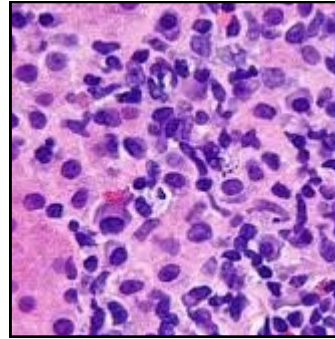


VPDs (particularly pertussis and chickenpox) are usually reported more frequently during the school year. The influenza season begins in October, with cases typically occurring beginning in December and peaking during January or February. For 2021, December had the highest peak of cases, due to the influenza cases reported at that time (see Figure 20).

Hepatitis A is a disease caused by the hepatitis A virus, which targets the liver. It is transmitted via the fecal-oral route either by person-to-person contact or by consumption of contaminated food or water. Hepatitis A is highly contagious and is best prevented through vaccination.

Since 1999, when routine vaccination was recommended for children living in states with high incidence (including Utah), the rates of hepatitis A have steadily declined. In recent years, however, there has been a resurgence of the disease due to outbreaks among high-risk populations.

A widespread person-to-person outbreak of hepatitis A across the United States was identified in the mid-2010s, and affected Utah from 2017 to 2019. Utah continues to monitor reported hepatitis A cases within the community and prevent outbreaks. In 2021, Davis County had **one** case of hepatitis A reported (See Figure 21).



Hepatitis A is a liver infection caused by the hepatitis A virus (HAV). It is highly contagious and can be transmitted by the fecal-oral route.

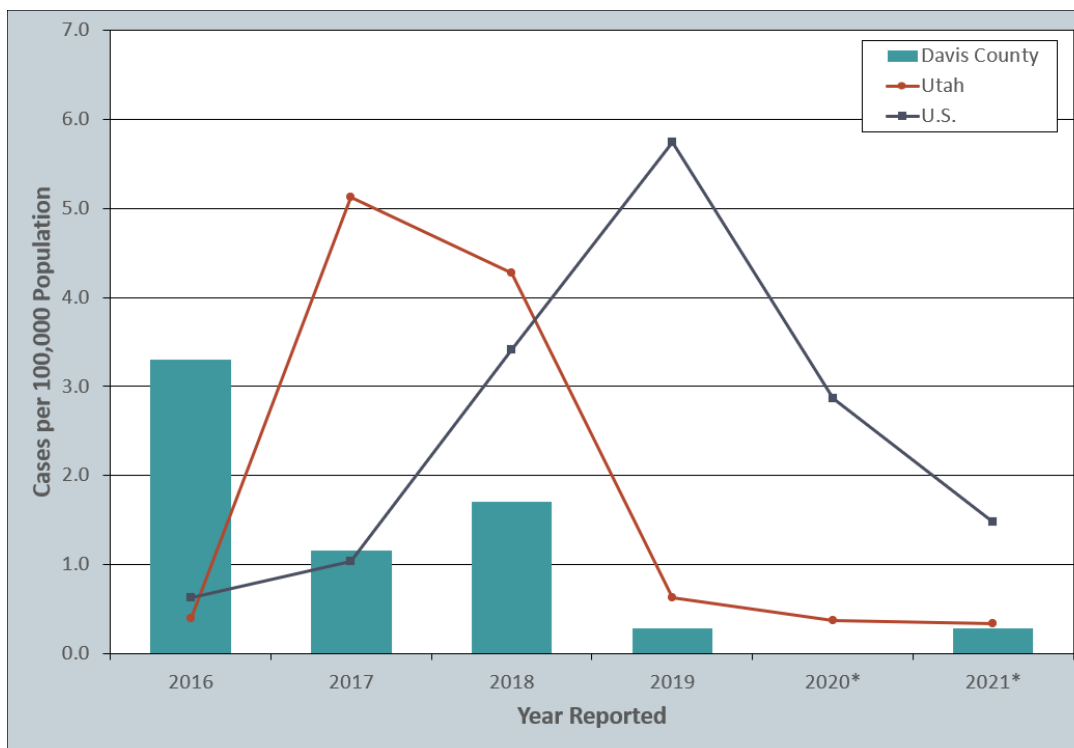
## Overview

There was one case of hepatitis A reported in Davis County in 2021.

There has been a resurgence of hepatitis A due to outbreaks among high-risk populations.

Over the past few years, Davis County had lower rates of hepatitis A when compared to Utah and the United States.

Figure 21. Hepatitis A, Davis County, Utah, U.S., 2016-2021



\*Utah and United States 2020 and 2021 data are provisional.

## Overview

There were 11 cases of hepatitis B reported in Davis County in 2021.

During 2021, there was one hepatitis B acute case reported.

In 2021, nine pregnant women were referred to DCHD's Perinatal Hepatitis B Prevention Program.

Hepatitis B is a VPD caused by the hepatitis B virus (HBV). It is transmitted through blood or body fluids. Common modes of transmission include percutaneous and permucosal exposure to infectious body fluids, sharing needles or syringes, sexual contact with an infected person, and perinatal exposure from an infected mother. In the United States, an estimated 850,000 to 2.2 million persons have chronic HBV infection. Acute HBV infection occurs most commonly among adolescents and adults in the United States.

As many as 90% of infants who acquire HBV infection from their mothers at birth become chronically infected. Of children who become infected with HBV between 1-5 years of age, 25-50% become chronically infected. The risk drops to 6-10% when a person is infected over 5 years of age.

During 2021, there were **11** cases of hepatitis B reported in Davis County. Ten of the cases reported were previous, chronic infections, whereas one was determined to be a new, acute infection. Several of these cases were at high risk for infection (e.g. foreign born, intravenous drug users, sexual/household exposure to a positive contact).

### Perinatal Hepatitis B Prevention Program

The Perinatal Hepatitis B Prevention Program is responsible for the case management (evaluation, monitoring, testing, and treatment) of all positive reported cases among pregnant females in Davis County. Prior to the baby's birth, arrangements are made with the delivering hospital to administer hepatitis B immune globulin (HBIG) and the first dose of hepatitis B vaccine to the newborn within 12 hours after delivery, in an effort to prevent the newborn from acquiring the virus. The newborn is monitored until all three doses of vaccine have been administered. After vaccination, serology testing is conducted to ensure antibody protection. If the infant is a non-responder to the vaccine, a second series is given. Testing is repeated at completion of the second series. Women, who are prenatally tested and determined to be chronic hepatitis B carriers, are interviewed to identify close contacts. Identified contacts (sexual partners, household contacts, and children) are recommended to have testing to determine their infection status. If serology testing is negative, the hepatitis B vaccination series is encouraged. The case management of pregnant females in this program can range from 8-18 months.

In 2021, **nine** pregnant women were referred to Davis County Health Department's Perinatal Hepatitis B Prevention Program.



The mission of the Perinatal Hepatitis B Prevention Program is to increase identification and treatment of women, their infants, and household contacts that are positive for the hepatitis B virus.

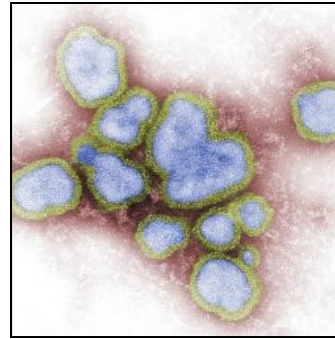
Influenza is an acute respiratory infection caused by ribonucleic acid (RNA) viruses from the *Orthomyxoviridae* family. Humans are the primary reservoir for human influenza, but many influenza species can also infect birds and mammals. Influenza is transmitted via respiratory droplets and direct contact.

Because of the large number of cases that occur each season, traditional surveillance methods are impractical for influenza. Therefore, the disease is monitored using a variety of mechanisms. One method is through the use of sentinel sites. Davis County tracks physician visits for influenza-like illness (fever of  $\geq 100^{\circ}$  F with a cough and/or sore throat) at sentinel sites throughout the county. These sites report data weekly to identify when influenza season peaks and monitor the burden of disease in the county.

Hospitals and other clinics submit specimens for influenza testing/typing to the Utah Public Health Laboratory (UPHL) so that circulating strains can be identified.

In addition, medical providers, hospitals, and laboratories are required by state law to report hospitalized influenza cases and pediatric influenza deaths to the local health departments. These two levels of reporting help public health evaluate disease severity, which is another important aspect of surveillance.

Davis County Health Department also partners with Davis School District to monitor elementary school absentee data. When schools experience a higher than expected absentee rate, the district is notified and an investigation is conducted to determine the cause. Increases in absenteeism are often observed when influenza season peaks (see Figure 22). Absenteeism data for 2021-22 influenza season was compared to the 2019-20 season due to the COVID-19 pandemic. Overall, the 2021-22 has been higher than what it has been traditionally, which could be in part due to COVID-19.



Flu is a contagious respiratory illness caused by influenza viruses. It can cause mild to severe illness.

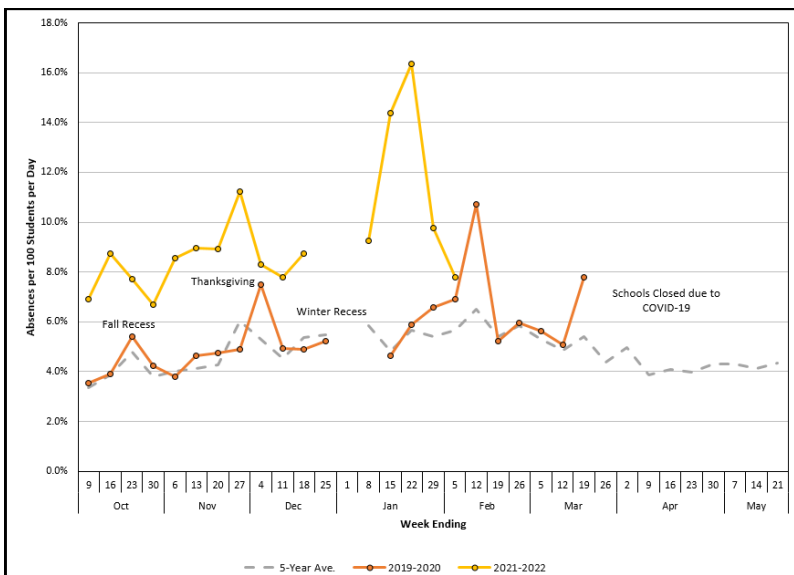
## Overview

A total of three hospitalized-influenza cases were reported during the 2020-21 influenza season.

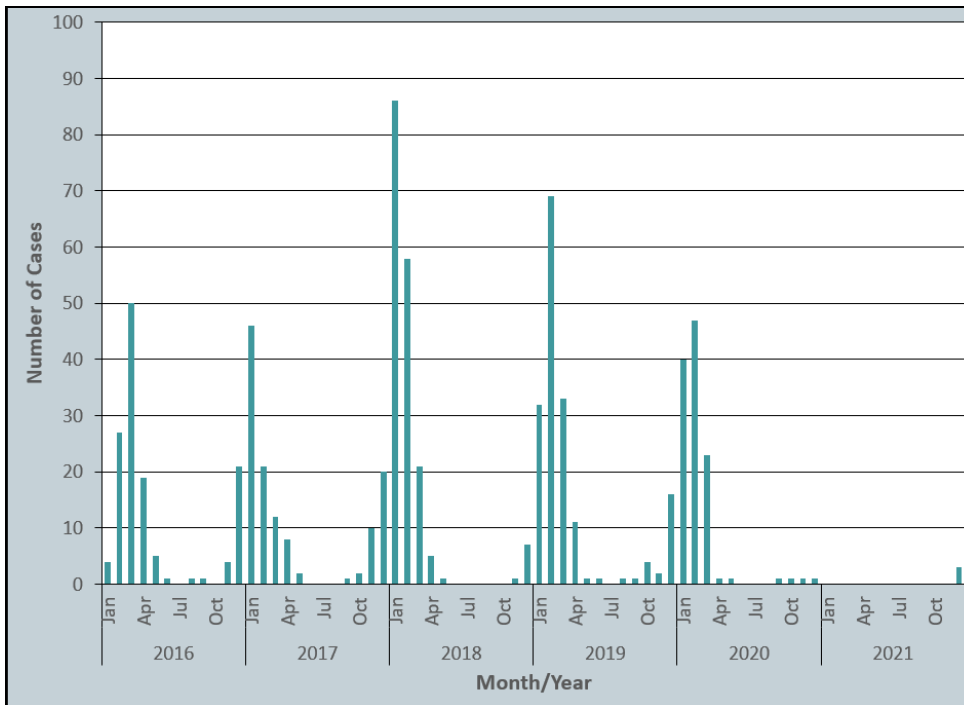
Due to the COVID-19 pandemic, absenteeism rates are higher than what it has been in the past.

Thus far, the current influenza season (2021-22) has been at a low severity.

**Figure 22. Elementary School Absenteeism—Davis County, 2021-22, 2019-20, 5-Year Average**



**Figure 23. Hospitalized Influenza Cases by Month, Davis County, 2016-2021**



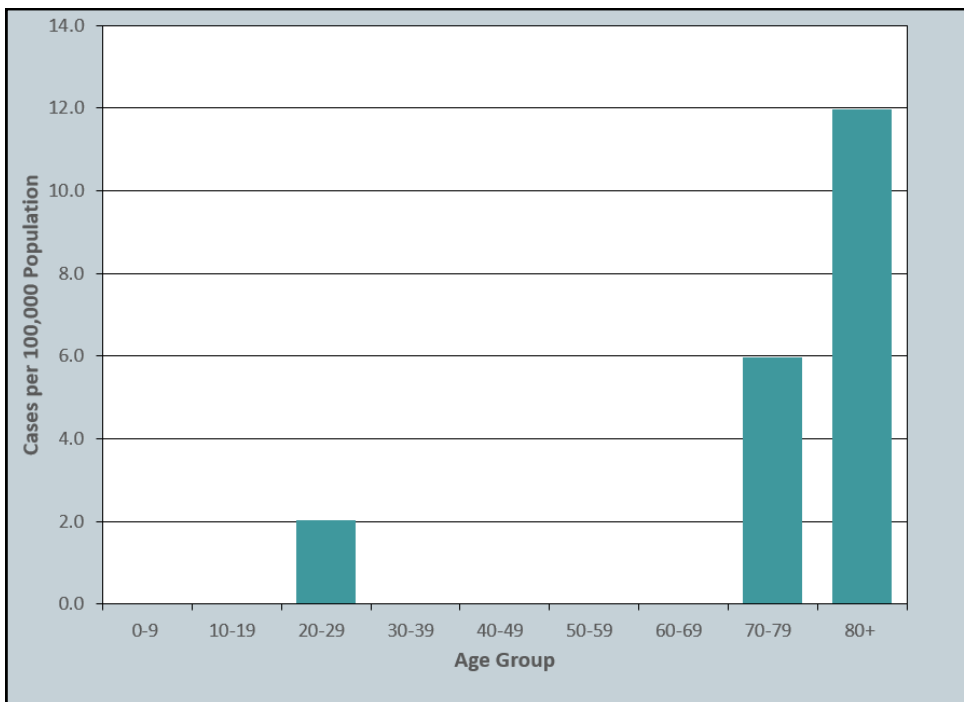
The 2020-21 influenza season (October 2020 - May 2021) was less severe than the previous influenza season in Davis County (see Figure 23). A total of **three** hospitalized-influenza cases were reported during the 2020-21 season, a 97.8% decrease compared to the 2019-20 season. A part of the decline in hospitalized influenza cases could be in part due to restrictions put into place during the COVID-19 pandemic.

Although influenza cases can occur at any time of the year, influenza viruses thrive during cold weather and cases typically peak in the winter months (January and February). The 2020-21 influenza season hospitalized cases were reported early on in the season (October to December).

The very young and very old are the populations most severely affected by influenza infection. In the 2020-21 influenza season, the elderly groups had the highest rates of hospitalizations (see Figure 24).

The most recent influenza season (October 2020 - May 2021) was drastically less severe, largely due to community-wide infection control measures in place because of the ongoing COVID-19 pandemic.

**Figure 24. Incidence of Hospitalized Influenza Cases by Age Group, Davis County, 2020-21 Influenza Season**







Pertussis is a respiratory illness commonly known as “whooping cough” due to the gasping sound a patient makes when they suck in air after a coughing fit.

Pertussis is a VPD caused by the bacteria *Bordetella pertussis*. The disease is of particular concern in infants because of higher rates of hospitalization, pneumonia, and death, when compared with older children and adults.

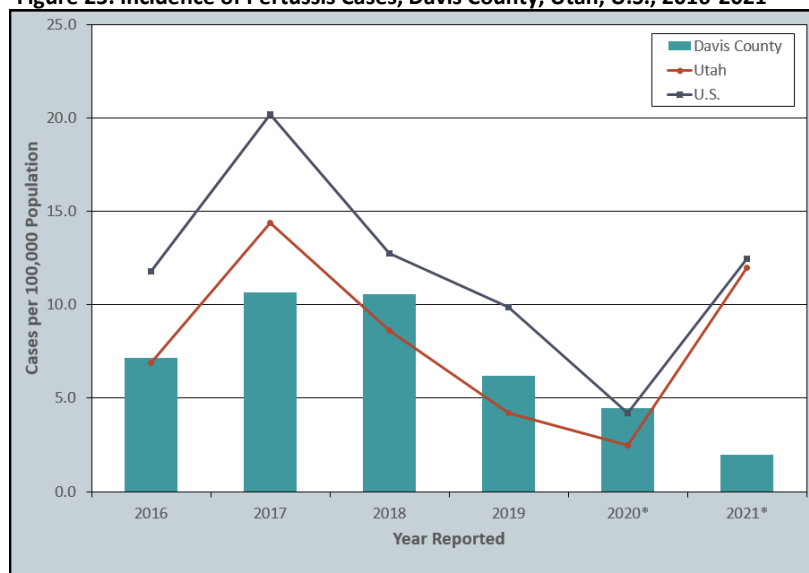
All reported pertussis cases are investigated promptly in an effort to stop disease spread. Contacts that experience a prolonged exposure to an infected case may benefit from antibiotic prophylaxis, if administered in a timely manner. Children are routinely vaccinated against pertussis before entry into the school system. Upon entry into junior high, a booster dose of tetanus, diphtheria, and acellular pertussis (TD/Tdap) is required. The Tdap is a one-time vaccine and is

recommended for anyone age 11-64 years. Recent guidance from the Centers for Disease Control and Prevention recommends pregnant women receive a Tdap vaccine with every pregnancy, preferably given between weeks 27-36. Tetanus vaccination, however, is recommended every 10 years.

The population most often affected by pertussis are those who are under-vaccinated, including infants/children under five years (because they have not yet completed the full vaccination series). Although cases are also common in older children and adults due to waning immunity and vaccine exemptions, illness in these age groups is usually milder and the diagnosis is often delayed or missed.

During 2021, there were **seven** cases of pertussis reported in Davis County, a 56.3% decrease from 2020, when there were 16 cases (see Figure 25). In Davis County, pertussis rates have decreased over the past few years.

**Figure 25. Incidence of Pertussis Cases, Davis County, Utah, U.S., 2016-2021**



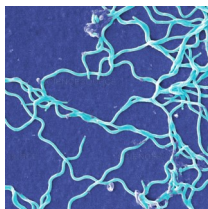
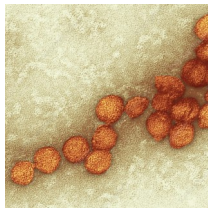
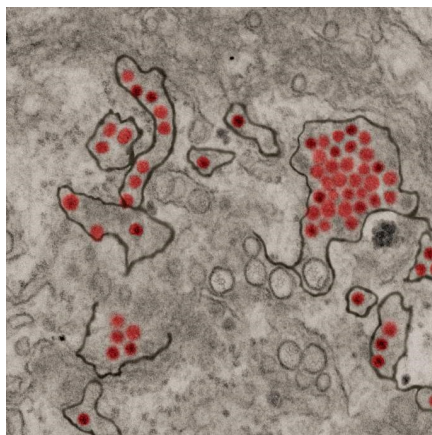
\*Utah and United States 2020 and 2021 data are provisional.

## Overview

There were seven cases of pertussis reported in Davis County during 2021.

Over the past few years, pertussis rates have declined.

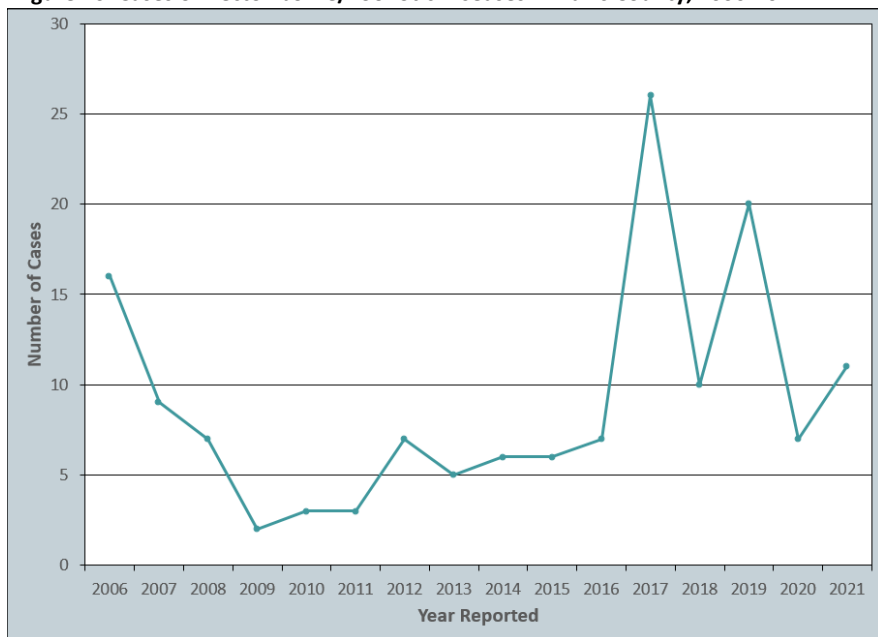
No outbreaks of pertussis were investigated during 2021.



# Vector-borne & Zoonotic Diseases

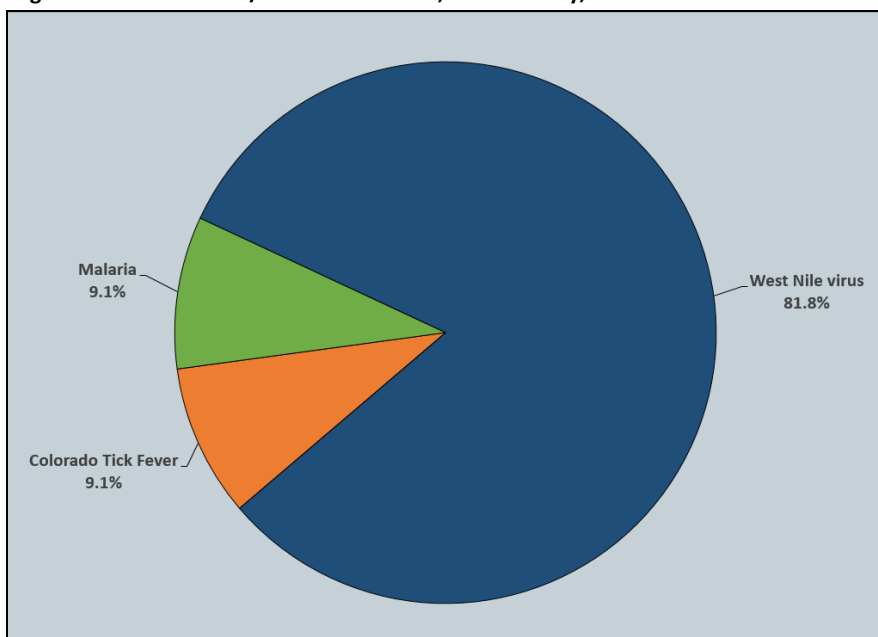
A vector-borne or zoonotic disease is one that can be passed between insect or animal to humans.

Figure 26. Cases of Vector-borne/Zoonotic Diseases in Davis County, 2006-2021



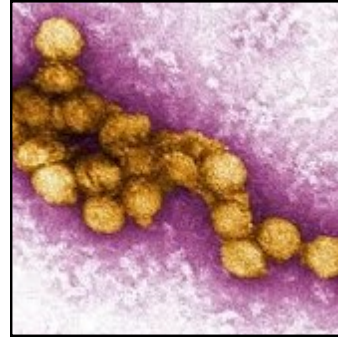
Vector-borne/zoonotic diseases are those diseases transmitted by an animal or insect. Vector-borne/zoonotic diseases do not occur often in Davis County. Typically vector-borne/zoonotic illnesses are contracted during international or out-of-state travel. Over the last few years, Davis County has not had a common trend in the number of diseases reported (see Figure 26).

Figure 27. Vector-borne/Zoonotic Diseases, Davis County, 2021



A total of **11** cases of vector-borne/zoonotic disease were reported in Davis County during 2021. West Nile virus was the most frequently reported vector-borne/zoonotic disease with **nine** cases (81.8%), and malaria and Colorado Tick Fever each with **one** case (9.1%) (see Figure 27).

West Nile virus is a virus most commonly spread to people through mosquito bites. In North America, cases of West Nile virus occur during mosquito season, which starts in the summer and continues through fall. Overall, the majority of the United States experiences cases of neuro-invasive West Nile virus (see Figure 28). Fortunately, most people infected do not have symptoms. However, some may develop a fever with headache, body aches, joint pain, vomiting, diarrhea, or rash. Most will recover completely, although fatigue and weakness can last for weeks or months. Some may also develop severe illness affecting the central nervous system causing high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weaknesses, vision loss, numbness, or paralysis.



Zika virus is spread mostly by the bite of an infected *Aedes* mosquito, but can be passed from a pregnant woman to her fetus. Infection during pregnancy can cause birth defects. Sexual transmission of Zika virus is also possible.

West Nile virus can be prevented by avoiding mosquito bites. This includes using a mosquito repellent containing DEET (*N,N*-Diethyl-*meta*-toluamide) and wearing long-sleeved shirts and long pants while outdoors, especially from dusk to dawn - when the mosquitoes that carry West Nile virus are most active.

During 2021, there were **nine** cases of West Nile virus reported in Davis County. Of the nine cases reported, five were neuro-invasive, while four were non neuro-invasive. One death was reported in Davis County, while all other cases recovered from their illness.

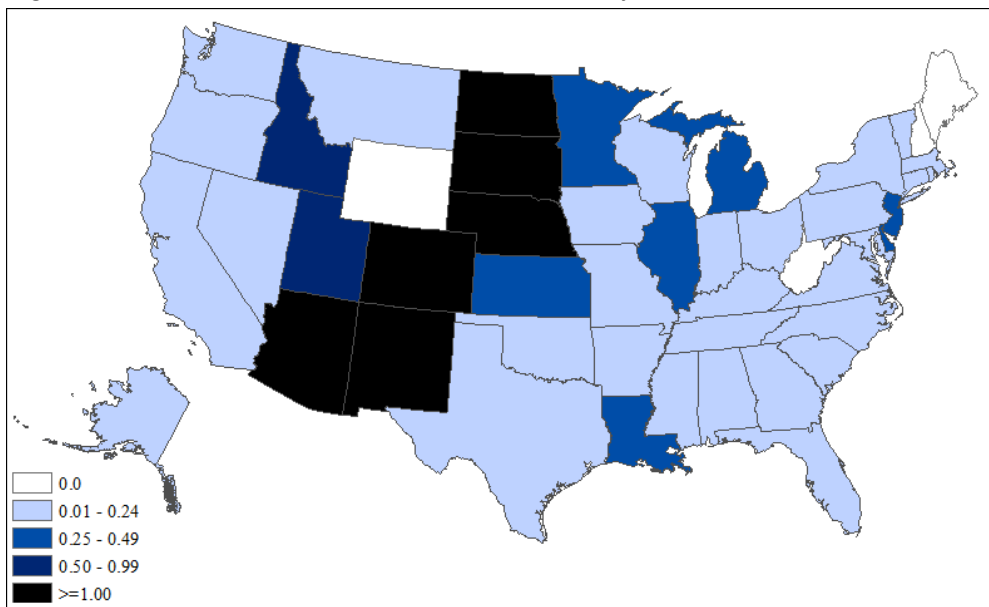
## Overview

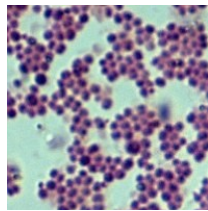
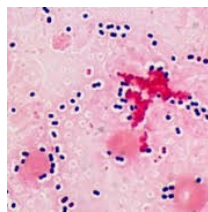
In 2021, nine confirmed cases of West Nile virus were reported in Davis County.

There was one death reported in Davis County in 2021.

Majority of the cases in the United States for West Nile virus were neuro-invasive in 2021.

Figure 28. West Nile Virus Neuroinvasive Disease Incidence by State, United States, 2021





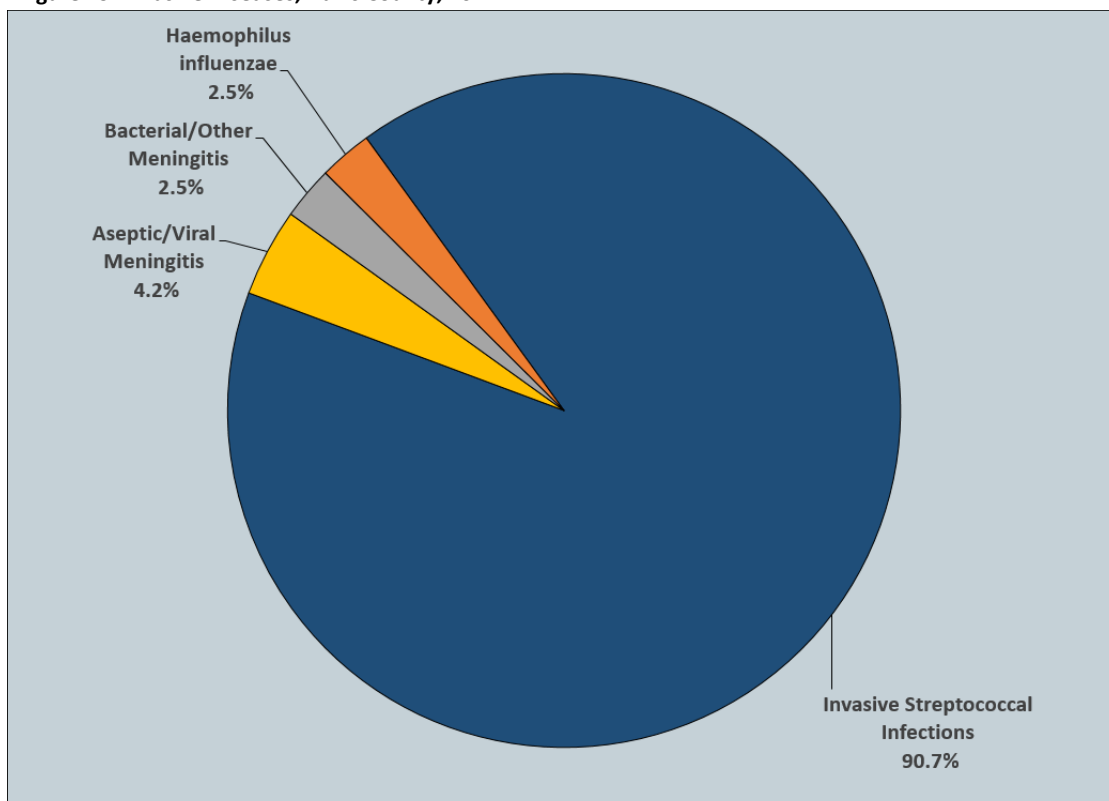
# Invasive Diseases

An invasive disease includes infections of the bloodstream, as well as meningitis and encephalitis.

Invasive diseases include infections of the bloodstream, as well as meningitis and encephalitis. All cases of meningitis, encephalitis, and toxic-shock syndrome are reportable to the health department, regardless of the causative organism. In addition, all cases of invasive streptococcal disease (isolation of *Streptococcus* from a normally sterile site) must be reported.

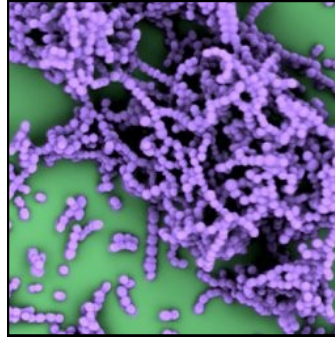
The most common invasive diseases reported in Davis County in 2021 were invasive streptococcal infections with **107** (90.7%) cases. These included Group A *Streptococcus*, Group B *Streptococcus*, Group C & G *Streptococcus*, *Streptococcus pneumoniae*, and other streptococcal infections. Aseptic/viral meningitis was the second most common disease in this category with **five** (4.2%) cases, then bacterial/other meningitis and *Haemophilus influenza* each with **three** (2.5%) cases (see Figure 29).

Figure 29. Invasive Diseases, Davis County, 2021



The primary invasive streptococcal diseases of public health concern are Group A, Group B, and *Streptococcus pneumoniae*.

- **Group A** streptococcal invasive disease manifests as necrotizing fasciitis, streptococcal toxic-shock syndrome, bacteremia, and pneumonia. It is transmitted person-to-person by contact with infectious secretions. Asymptomatic pharyngeal carriage occurs among all age groups, but is most common among children.
- **Group B** streptococcal invasive disease (GBS) in neonates manifests as sepsis, pneumonia, and meningitis. Infection in the first week of life is called early-onset GBS. In adults, sepsis and soft tissue infections are most common. Pregnancy-related infections include sepsis and amnionitis. Asymptomatic carriage in gastrointestinal and genital tracts is common and intrapartum transmission via ascending spread from vaginal and/or gastrointestinal GBS colonization occurs. Mode of transmission of disease in non-pregnant adults and older infants (>1 week) is unknown.
- **Group C** *streptococcus* is typically a zoonotic illness and the organisms can be found as pathogens in domestic animals such as horses, cows, birds, rabbits, and guinea pigs. Laboratories may misidentify them as Group A *streptococcus*. They can also be found as part of normal human flora. Many people with Group C infections have underlying health problems, but more recent studies have implicated this disease as an emerging human pathogen.
- **Group G** *streptococcus* is a normal human flora and individuals infected with this organism usually have underlying health problems, especially cancer.
- ***Streptococcus pneumoniae*** invasive disease manifests as pneumonia, bacteremia, meningitis, and sinus/ear infections. More than 90 types of pneumococcal bacteria exist, but not all are considered to be invasive. Of the strains causing invasive disease, 88% are serotypes included in the 23-valent polysaccharide vaccine (PPSV23). Before the first pneumococcal conjugate vaccine (PCV7) was introduced in 2000, the seven serotypes which it prevents were responsible for over 80% of severe pneumococcal infections among children. Now, the PCV13 vaccine includes the original seven serotypes in PCV7, plus six additional serotypes. The best way to prevent pneumococcal disease is by getting vaccinated.



Most strep infections are relatively mild illnesses such as strep throat, scarlet fever, and impetigo. Occasionally these bacteria can cause severe and life-threatening diseases.

## Overview

In 2021, there were 107 cases of invasive streptococcal infections reported in Davis County.

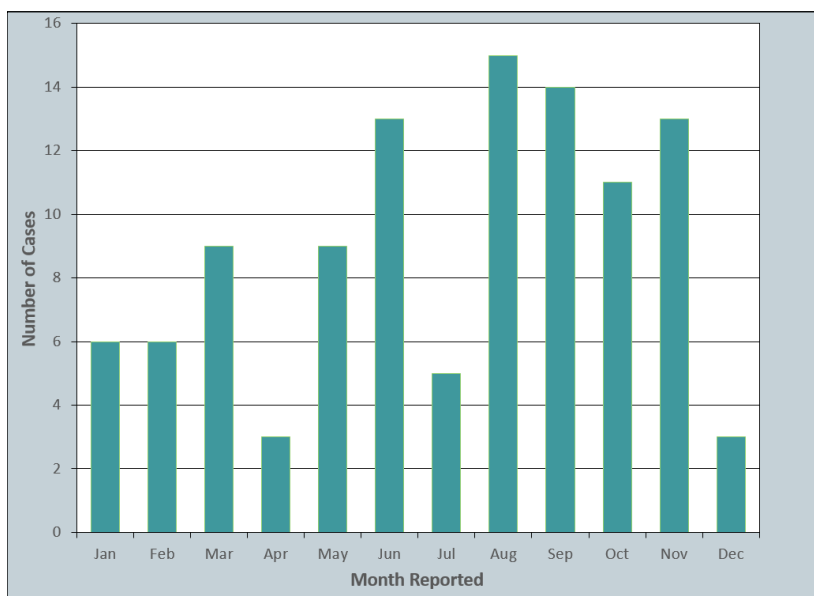
The majority of cases of invasive streptococcal infections were due to Group B *Streptococcus*.

There were two fatal cases of invasive streptococcal infections in 2021 in Davis County.



# Invasive Streptococcal Infections

**Figure 30. Invasive Streptococcal Infections by Month, Davis County, 2021**



In 2021, **107** cases of invasive streptococcal infections were reported (see Figure 30). The majority of cases were due to Group B *Streptococcus* and required investigation (see Table 5).

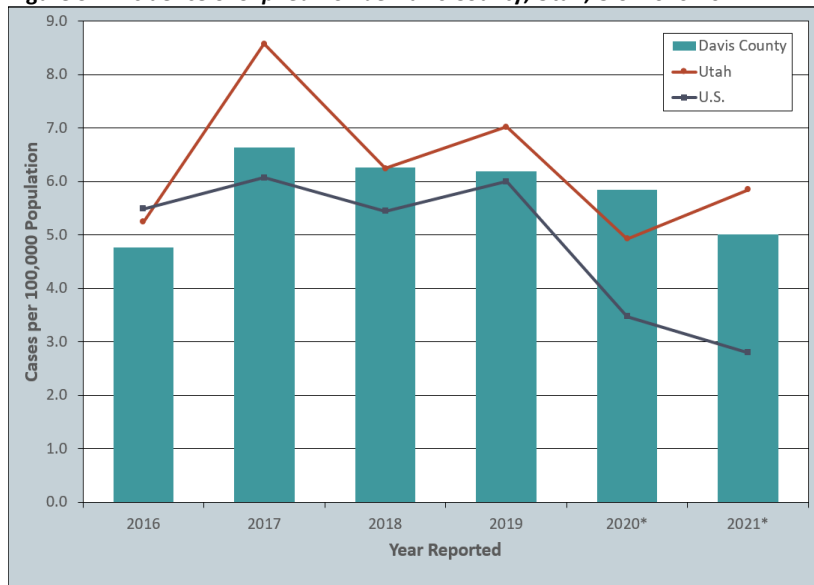
Invasive streptococcal infections tend to cause severe illness. In 2010, over 12% of reported invasive streptococcal infections in Davis County were fatal. Since then, the fatality rate among streptococcal infections has declined. In 2021, two out of 107 cases were fatal - a case fatality rate of 1.9%. This represents a 75.0% decrease in fatal cases from 2020, which reported eight cases.

Infection with *Streptococcus pneumoniae* is particularly serious. According to the CDC, anyone can get pneumococcal disease, but some people are at an increased risk. Those under the age of two, 65 years or older, and/or having certain medical conditions can increase a person's risk for pneumococcal disease. In 2021, one of the 18 (5.6%) *S. pneumoniae* cases in Davis County was fatal. *Streptococcus pneumoniae* rates have remained somewhat constant, but have slowly declined in Davis County during recent years (see Figure 31).

**Table 5. Types of Invasive Streptococcus Infections, Davis County, 2021**

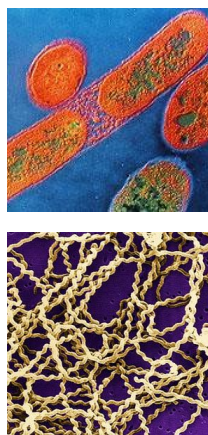
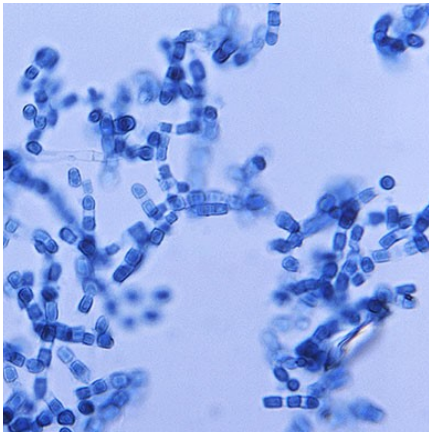
Type	Number of Cases(%)
Group A <i>Streptococcus</i>	18(17%)
Group B <i>Streptococcus</i>	28(26%)
Group C and Group G <i>Streptococcus</i>	12(11%)
Other <i>Streptococcus</i> ( <i>mitis</i> , <i>viridans</i> , etc.)	29(27%)
<i>Streptococcus pneumoniae</i>	18(17%)
Toxic-shock syndrome, Streptococcal	2(2%)
<b>Total</b>	<b>107(100%)</b>

**Figure 31. Incidence of *S. pneumoniae* Davis County, Utah, U.S. 2016-2021**



\*Utah and United States 2020 and 2021 data are provisional.





# Other Diseases

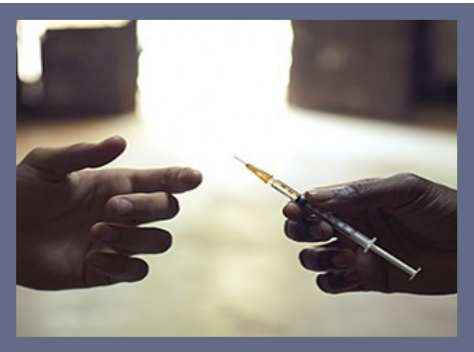
Diseases that do not fall under a specific identified category.

Diseases that do not fall under a specific identified category will be discussed in this section.

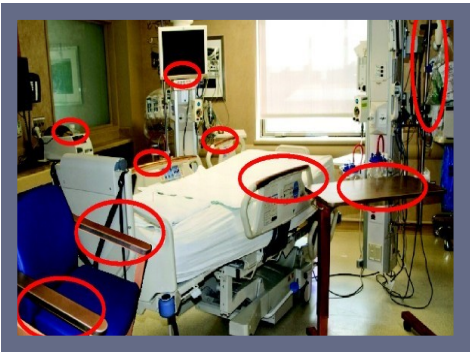
In 2021, hepatitis C infections made up the majority of this category, followed by carbapenem-resistant Enterobacteriaceae, coccidioidomycosis, legionellosis, and wound botulism (see Table 6).

Table 6. Types of Other Diseases, Davis County, 2021

Disease	Number of Cases
Hepatitis C, acute and chronic	127
Carbapenem-Resistant Enterobacteriaceae ( <i>Acinetobacter</i> , <i>E. Coli</i> —Carbapenem non-susceptible)	104
Coccidioidomycosis	10
Legionellosis	1
Hepatitis C, perinatal	1
Botulism, wound	1
<b>Total</b>	<b>244</b>



Hepatitis C



Carbapenem-Resistant Enterobacteriaceae (CRE)



Coccidioidomycosis

# Carbapenem-Resistant Enterobacteriaceae

## Overview

A total of **104** CREs were reported in Davis County in 2021.

An outbreak of CREs at a Davis County facility likely contributed to the increase of reported cases in 2021.

Public health continues to learn more about these organisms, including where they are occurring and how to prevent their spread.

The public health problem of antibiotic resistance is not new. However, due to the overuse of antibiotics in humans and animals, the problem is increasing in magnitude and new multidrug-resistant organisms (MDROs) are emerging. Carbapenem-resistant Enterobacteriaceae (CRE) are particularly concerning. Some CRE infections have developed resistance to most available antibiotics. CRE infections are very difficult to treat, can spread quickly, and may contribute to death in 40% of patients who become infected. Although these organisms are rare, they are increasingly identified in healthcare facilities throughout the United States.

Utah laboratories and healthcare facilities are required to report the following CREs to the state or local health department:

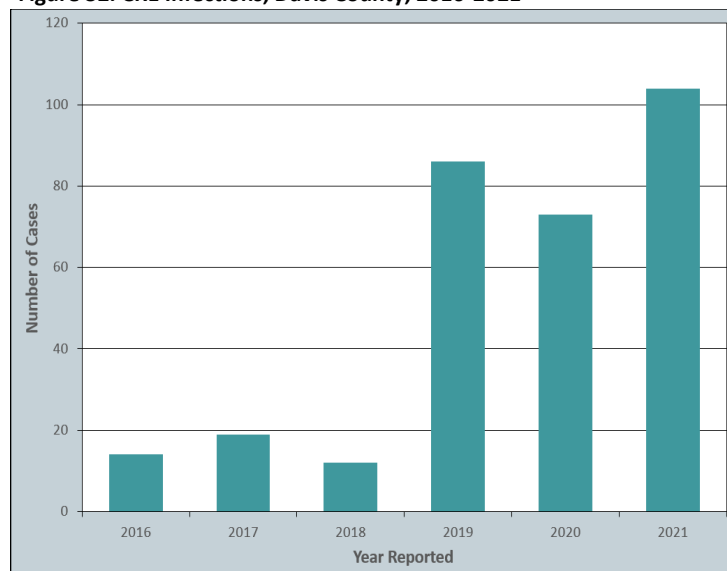
- *Acinetobacter* species with resistance or intermediate resistance to carbapenem (meropenem and imipenem) from any site.
- *Enterobacter* species with resistance or intermediate resistance to carbapenem (meropenem and imipenem) from any site.
- *Escherichia coli* with resistance or intermediate resistance to carbapenem (meropenem, ertapenem, and imipenem) from any site.
- *Klebsiella* species with resistance or intermediate resistance to carbapenem (meropenem, ertapenem, and imipenem) from any site.
- *Pseudomonas aeruginosa* with resistance or intermediate resistance to carbapenem (meropenem, ertapenem, and imipenem) from any site. This is only electronically reported and is not investigated at the local level.

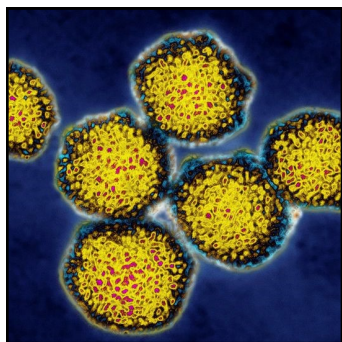
A total of **104** CREs were reported in Davis County during 2021 (see Figure 32). This represents a 42.5% increase from the 73 cases reported in 2020. An outbreak of CREs at a Davis County facility likely contributed to the increase of reported cases in 2021. The addition of *Pseudomonas aeruginosa* as a reportable condition likely contributed to the drastic increase in reported cases from 2018 to 2019.



*Klebsiella* is a type of Gram-negative bacteria that can cause different types of healthcare-associated infections, including pneumonia, blood infections, wound or surgical site infections, and meningitis.

Figure 32. CRE Infections, Davis County, 2016-2021





Hepatitis C is a bloodborne virus. Today, most people become infected with HCV by sharing needles or other equipment to inject drugs.

Hepatitis C is a disease caused by a virus that infects the liver. Over time it can cause liver damage including cirrhosis, liver failure, and cancer. Approximately 15-25% of those infected with hepatitis C virus (HCV) will recover from the infection. The remaining 75-85% develop chronic infection. Each year approximately 15,000 people die from the complications of liver disease caused by hepatitis C.

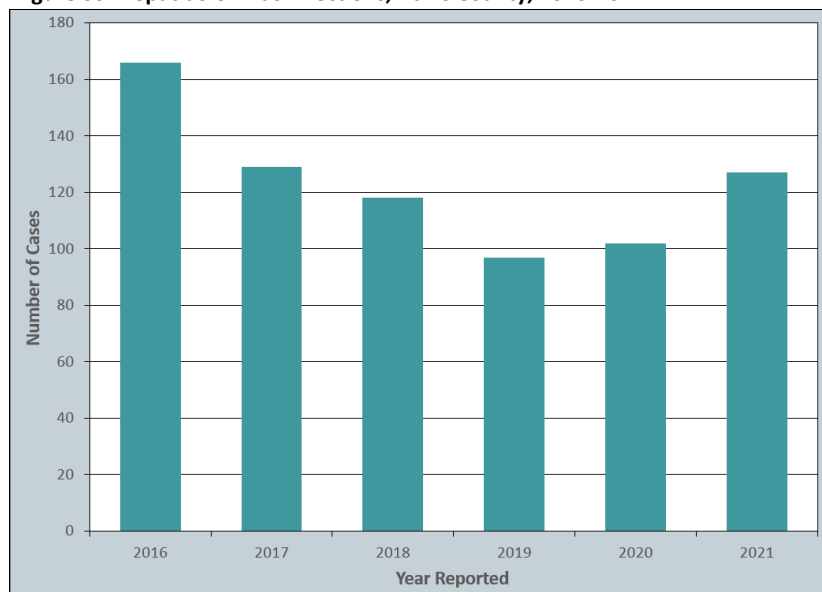
Most of those who develop chronic HCV infection remain asymptomatic for many years. Some experience a range of symptoms including fatigue, headache, joint aches, muscle aches, nausea, jaundice, loss of appetite, and abdominal pain.

HCV is a bloodborne pathogen that is predominantly spread by exposure to contaminated blood or blood products. Currently, the most prevalent mode of transmission is sharing needles or syringes to inject drugs. Sexual transmission of HCV can occur, but does not appear to be a common mode of transmission. Transmission can also occur from mother to her baby. HCV is not spread through casual contact, kissing, sneezing, hugging, sharing glasses/utensils, or from breast milk.

Hepatitis C is typically reported as a positive screening test for HCV antibodies.

Investigation of this disease is focused on determining whether the case is acute, chronic, or has a false-positive test. To do so, confirmatory testing is necessary. Many reports of hepatitis C come from blood donation/plasma centers, which have limited contact information for the person donating, making investigation of the disease difficult. Of those investigated, the most prevalent risk factor identified was injecting drugs, currently or in the past. Most infected individuals were unaware of their infection.

**Figure 33. Hepatitis C Virus Infections, Davis County, 2016-2021**



In 2021, **127** cases of HCV were reported in Davis County, a 25.7% increase from the 101 cases reported in 2020 (see Figure 33). One case of perinatal HCV was identified in Davis County in 2021.

## Overview

In 2021, **127** cases of HCV were reported in Davis County.

In 2021, one case of HCV perinatal was identified in Davis County.

Many reports of HCV come from blood donation/plasma centers, which have limited information on individuals, making disease investigation difficult.

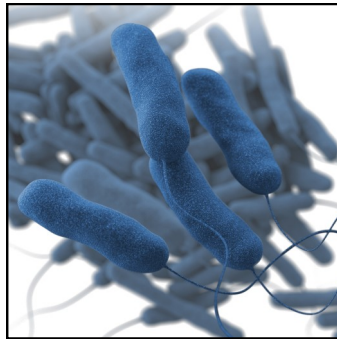
# Legionellosis

## Overview

A total of one case of legionellosis was reported in Davis County during 2021.

It is important for public health to identify the source of legionellosis before an outbreak occurs.

Both Davis County and Utah typically have lower rates of legionellosis when compared to the United States.



Legionellosis is a bacterial infection that may cause mild respiratory illness or pneumonia. It is associated with two distinct illnesses: Legionnaires' disease and Pontiac fever.

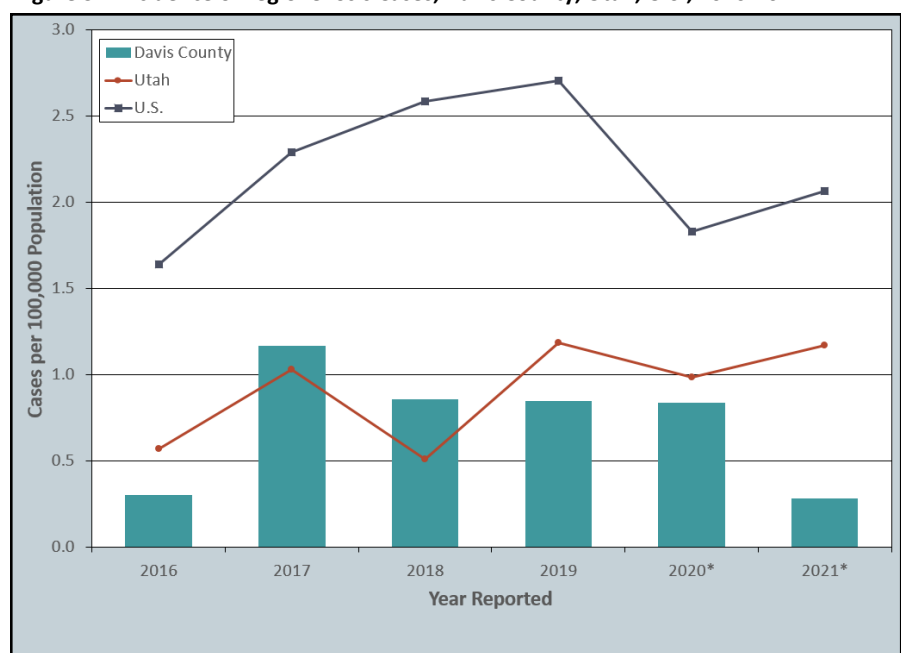
*Legionella* bacteria can cause Legionnaires' disease or Pontiac fever, collectively known as legionellosis. The disease is transmitted through the air from a soil or water source. All studies to date have shown that the organism cannot be spread from person-to-person. Outbreaks occur when individuals are exposed to a common source of *Legionella pneumophila* bacteria in the environment.

An estimated 8,000-18,000 people need care in a hospital due to Legionnaire's disease each year in the United States. However, many infections are not diagnosed or reported, so this number may be higher. Most legionellosis cases are sporadic; 23% are nosocomial (hospital acquired) and 10-20% can be linked to outbreaks.

Although *Legionella* is not spread from person-to-person, it is important for public health to identify the source of the infection before an outbreak occurs. Often, the source remains unknown. Aerosolizing of water, such as showers, continuous positive airway pressure (CPAP) machines, humidifiers, swamp coolers, and spas, provide a good mechanism for transmission. Healthy individuals, when exposed, typically do not develop the disease. However, those who are immunocompromised are at higher risk.

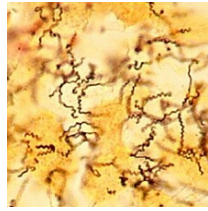
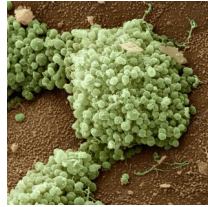
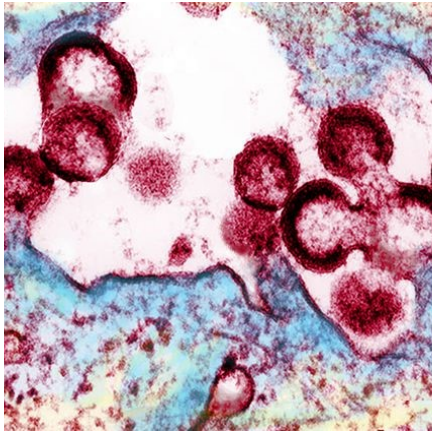
During 2021, there was **one** case of legionellosis reported in Davis County. Both Davis County and Utah typically have lower rates of legionellosis when compared to the United States (see Figure 34).

Figure 34. Incidence of Legionellosis Cases, Davis County, Utah, U.S., 2016-2021



\*Utah and United States 2020 and 2021 data are provisional.





# Sexually Transmitted Diseases

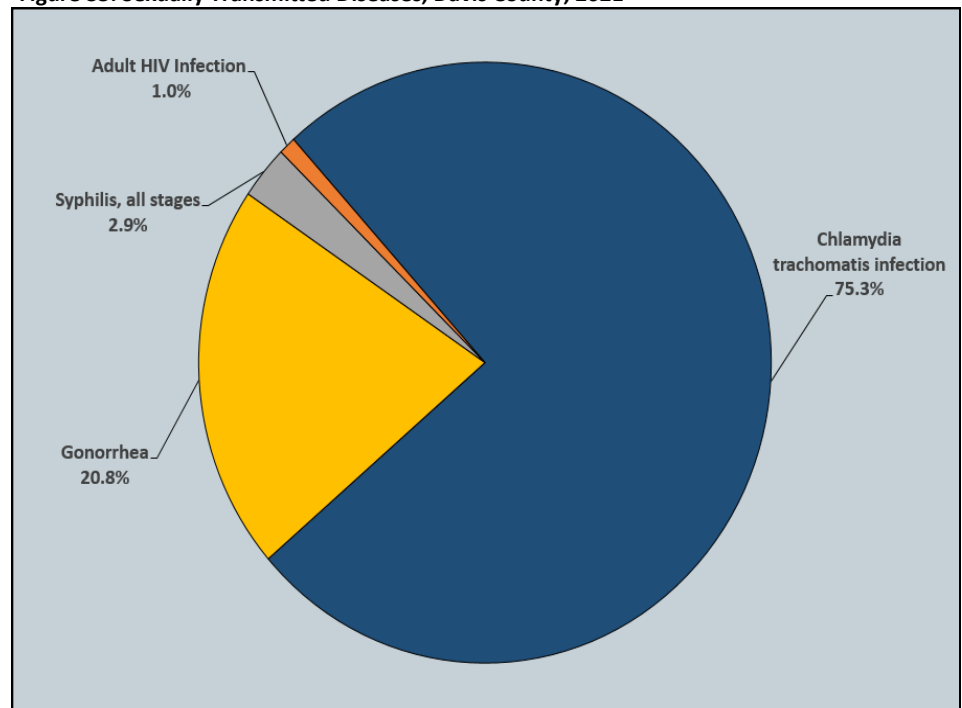
Diseases that are caused by bacteria, viruses, and other organisms transmitted from one person to another through sexual activity.

Sexually transmitted diseases (STDs) are caused by bacteria, viruses, and other organisms transmitted from one person to another through sexual activity. Bacterial STDs such as chlamydia, gonorrhea, and syphilis are curable by using appropriate antibiotic therapy. However, permanent damage may occur (e.g. pelvic inflammatory disease, sterility, organ damage, meningitis) especially if treatment is delayed. Viral STDs such as herpes simplex virus (HSV) and human immunodeficiency virus (HIV) are not curable, but treatment can slow disease progression by reducing viral load (contagiousness) and improving quality of life. Complications from STDs range from mild/moderate illness to infertility, chronic pain, cancer, and even death. Less invasive testing techniques (e.g. urine testing, self-collected oral/rectal testing) have made chlamydia and gonorrhea testing more practical and convenient.

According to a report released by CDC in 2021, STD rates had hit an all-time high for a sixth consecutive year (reporting from 2014-2019). CDC later released an article in 2021 stating that rates of STDs had dropped drastically during March-April 2020 when compared to 2019, largely in part due to the COVID-19 pandemic. However, cumulative totals continued to rise through 2020, particularly gonorrhea and syphilis. Davis County saw a similar trend, and has seen an increase of gonorrhea and syphilis in 2021.

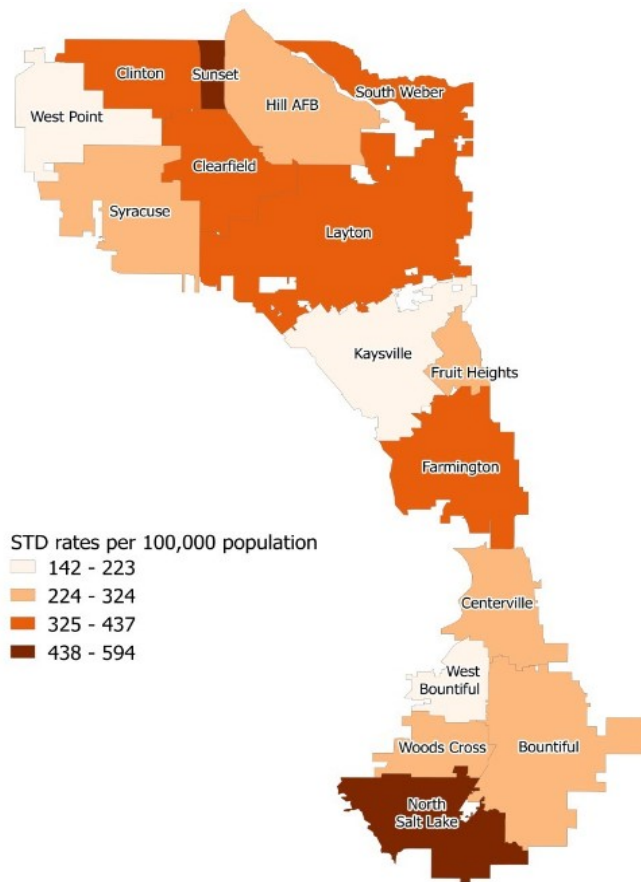
Sexually transmitted diseases reported in Davis County during 2021 included chlamydia, gonorrhea, syphilis, and HIV infection. Chlamydia was the most commonly reported STD with **940** (75.3%) cases, followed by gonorrhea with **260** (20.8%) cases, syphilis with **36** (2.9%) cases, and HIV with **12** (1.0%) cases (see Figure 35).

Figure 35. Sexually Transmitted Diseases, Davis County, 2021



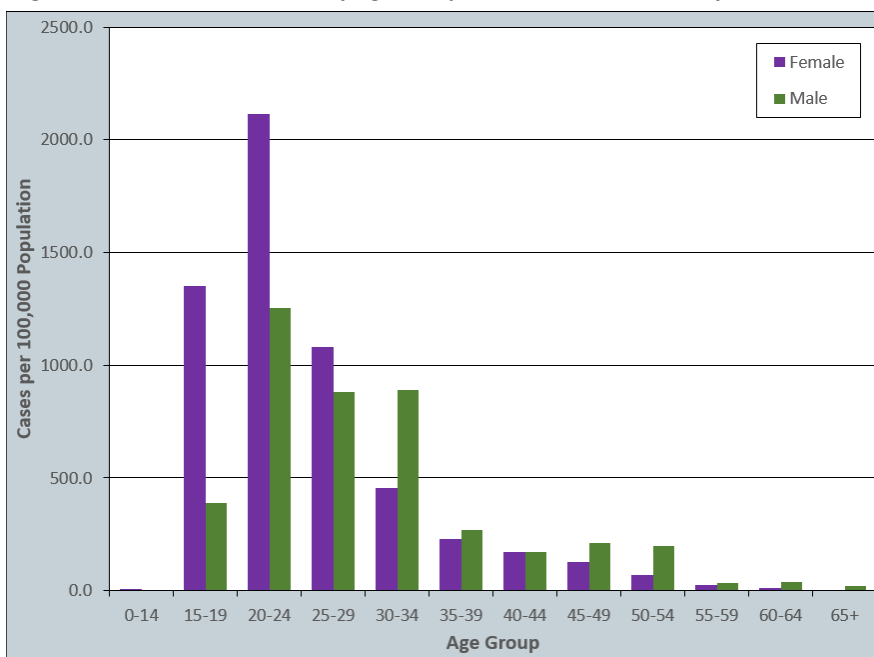
# Sexually Transmitted Diseases

**Figure 36. Incidence of all STDs by City, Davis County, 2021**



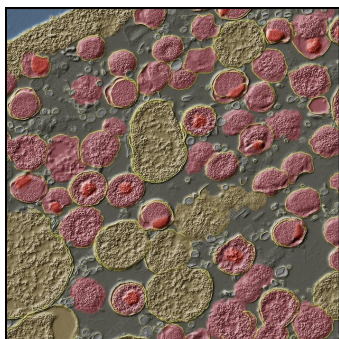
STDs occurred among residents of every city in Davis County. The incidence rate for STDs in Davis County through 2021 was 359.0 cases per 100,000 residents. The city rates were adjusted by age to account for the higher incidence of STD infection in cities with a larger young adult population. North Salt Lake and Sunset had the highest rate of STDs, while West Bountiful, Kaysville, and West Point had the lowest rates 2021 (see Figure 36).

**Figure 37. Incidence of all STDs by Age Group and Gender, Davis County, 2021**



In 2021, STDs were most often reported among 20-24 years old (see Figure 37). Sexually transmitted diseases were most often reported among women (55.8%).





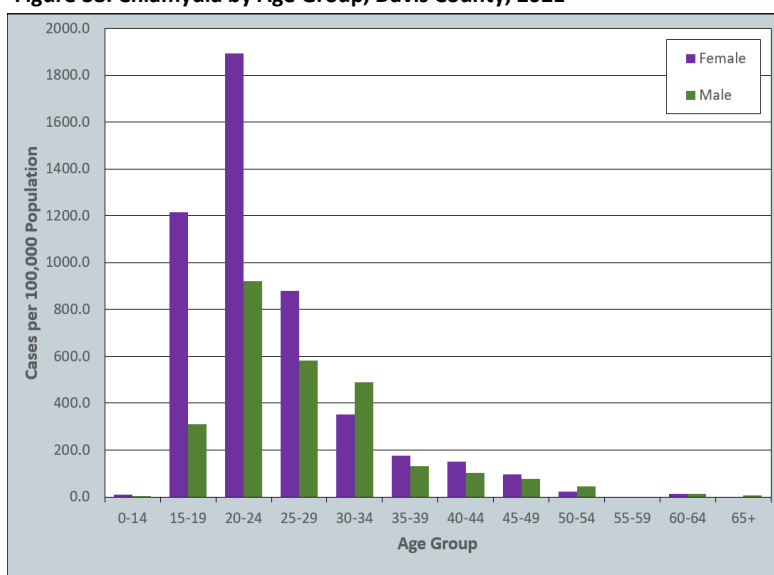
Chlamydia is the most commonly reported STD in the United States.

Chlamydia is an STD caused by the bacteria *Chlamydia trachomatis*. Chlamydia is the most common reported sexually transmitted disease in the United States. Often, males and females infected with chlamydia do not have obvious symptoms. Serious complications include infertility, ectopic pregnancies, epididymitis, arthritis, and prostatitis.

During 2021, there were **940** cases of chlamydia reported in Davis County, a 1.5% decrease from the 954 cases reported in 2020 (see Figure 38).

Chlamydial infections continue to account for the largest disease burden in Davis County, apart from COVID-19. However, Davis County traditionally has lower rates of chlamydia

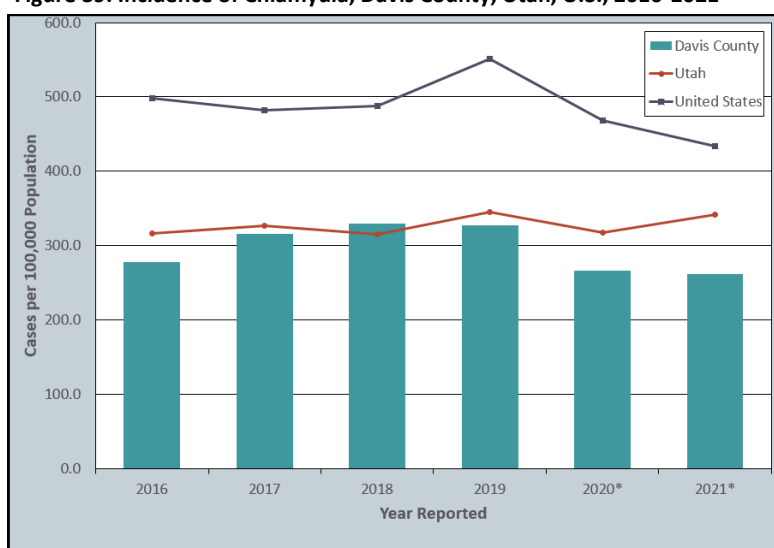
**Figure 38. Chlamydia by Age Group, Davis County, 2021**



when compared to Utah and the United States (see Figure 39).

Most concerning is the age group most commonly affected, the 15-24 year olds (see Figure 39). Through case investigations, a number of high-risk behaviors were identified, including early initiation of sexual activity, multiple sex partners, unprotected sex, anonymous partners, using drugs or alcohol while engaging in sexual activities, group sex, and anal intercourse.

**Figure 39. Incidence of Chlamydia, Davis County, Utah, U.S., 2016-2021**



\*Utah and United States 2020 and 2021 data is provisional.

## Overview

A total of **940** chlamydia cases were reported in Davis County during 2021.

Chlamydial infections continue to account for the largest disease burden in Davis County.

Traditionally, Davis County has lower rates of chlamydia when compared with Utah and the United States.

# Chlamydia

Chlamydia is more prevalent in females versus males (see Figure 40). Women are more susceptible to infection and the female reproductive system is an excellent environment for bacteria to grow. It also makes it more difficult to determine if signs or symptoms from an infection are present. Women are less likely to have symptoms of chlamydia when compared to men. If symptoms do occur, they may go away, yet the infection can remain.

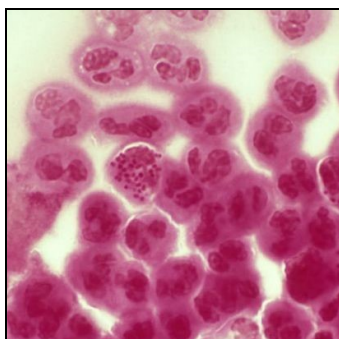
Females are often diagnosed during routine medical visits. Males are typically diagnosed following contact investigations or if they become symptomatic. It is the goal of the health department to locate partners, offer free testing and treatment, provide disease education, and assist in the development of a risk-reduction plan. Contact investigations not only limit the spread of infection to other individuals, but they also decrease the likelihood of re-infection. Re-infections can occur when appropriately treated individuals engage in sexual activity with their untreated partners or resume sexual activity before the infection is cleared.

Effective January 1, 2019, Utah's public health procedures no longer require local health departments to attempt to investigate all cases of chlamydia. Instead, health departments individually determine local chlamydia case investigation procedures. Chlamydia remains as a reportable infection and healthcare providers and laboratories are still required to report cases within three working days from the time of identification.

Beginning in 2019, Davis County Health Department began focusing chlamydial investigation efforts on higher risk populations, including those 21 years of age or younger, men who have sex with men (MSM), and pregnant women. In 2021, Davis County Health Department did not perform as many investigations for chlamydia, due to the COVID-19 pandemic response.

**Figure 40. Chlamydia by Gender, Davis County, 2016-2021**



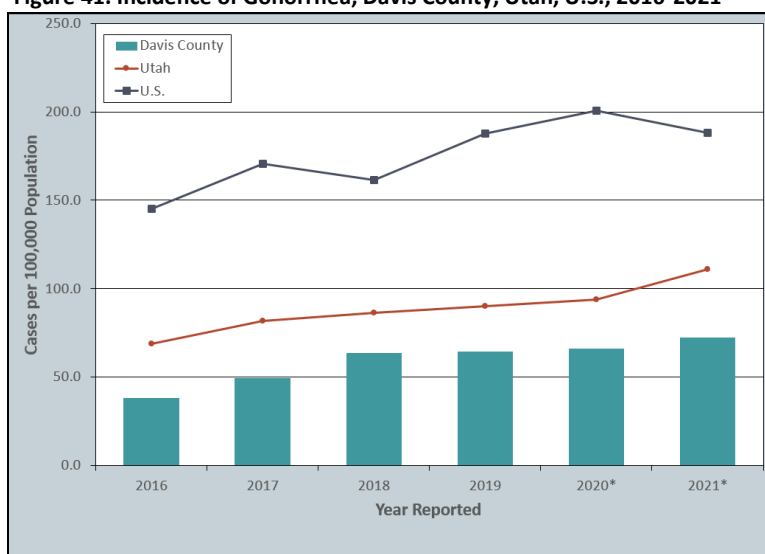


Gonorrhea has progressively developed resistance to several antibiotics used to treat it.

Gonorrhea is an STD caused by the bacteria *Neisseria gonorrhoeae*. Gonococcal infections are often asymptomatic in women and are becoming increasingly so in men. If left untreated, gonorrhea may result in serious complications including chronic pain, infertility, septic arthritis, hepatitis, endocarditis, and meningitis. Gonorrhea is complex and has the ability to develop resistance to antibiotics.

Fluoroquinolones are no longer recommended by CDC due to increasing resistance. Cephalosporins are the only remaining antibiotic class recommended for treatment.

**Figure 41. Incidence of Gonorrhea, Davis County, Utah, U.S., 2016-2021**

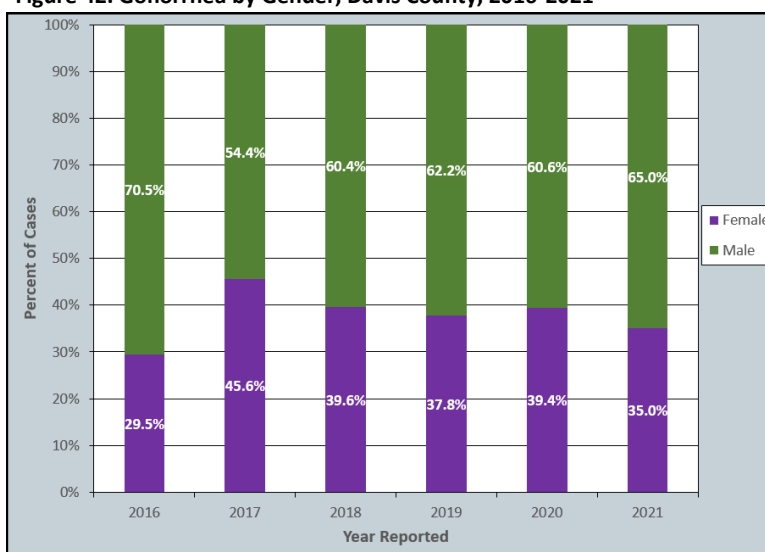


\*Utah and United States 2020 and 2021 data are provisional.

During 2021, there were **260** cases of gonorrhea reported in Davis County, a 9.2% increase from the 238 cases reported during 2020. Davis County gonorrhea rates continue to be well below the United States and Utah (see Figure 41).

Unlike chlamydia, gonococcal infections in Davis County were more frequent in males (see Figure 42). Disease interviews identified MSM, multiple sex partners, anonymous partners, incarceration, and substance abuse as common risk factors for gonococcal infection.

**Figure 42. Gonorrhea by Gender, Davis County, 2016-2021**



## Overview

During 2021, **260** cases of gonorrhea were reported in Davis County.

Gonorrhea infections in Davis County are more frequent in males.

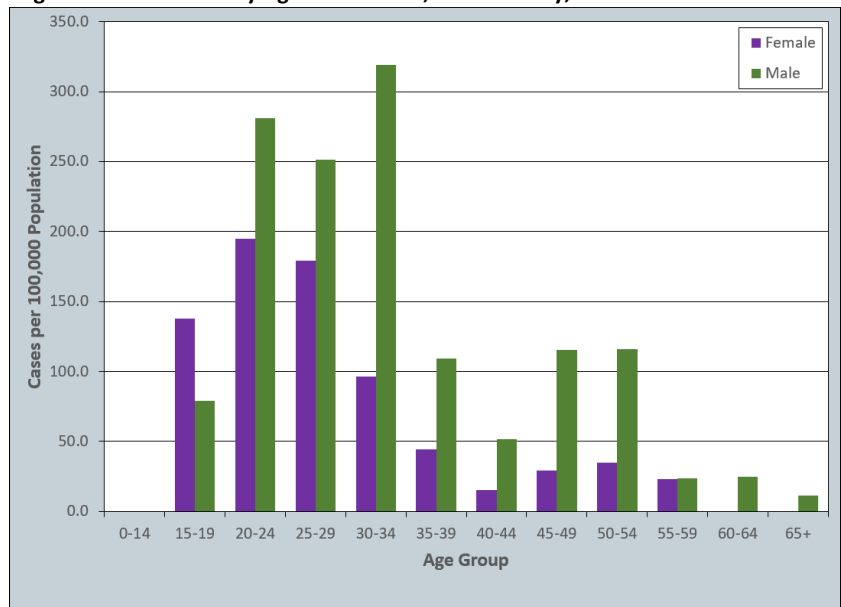
Davis County continues to have lower rates of gonorrhea when compared with Utah and the United States.

In 2021, the median age of those infected with gonorrhea was 24 years. The only age group that females had a higher case rate than males was in 15-19 (see Figure 43). The primary ages of those affected by gonorrhea, across both genders are ages 15-34.

A urine sample can be used to screen for both gonorrhea and chlamydia. This less-invasive testing process is more appealing to patients and may encourage sexually-active individuals to seek testing. When patients are participating in rectal or oral intercourse, however, some STDs may be missed if exclusively using the conventional urine test. Medical providers are encouraged to include rectal/oral swabs in STD screenings for patients that engage in rectal and/or oral intercourse. Another testing option involves self-collected specimens. Studies have shown that self-collected rectal/oral specimens had test results that were of equal or better accuracy than those collected by clinical providers.

Beginning in 2019, rectal and oral testing has been available to high-risk patients and their partners. Davis County Health Department partners with Midtown Community Health Center-Davis (MTCHC) to help provide STD testing and education. Two options are available to the community through MTCHC. First, the Low-Cost Screening Clinic provides a walk-in clinic where individuals can have access to STD screening. These individuals are provided with educational materials and offers testing for STDs. Results, further investigation, and medications are provided by the health department. The second option is the Provider Exam STD Testing, which allows individuals who are symptomatic to receive services through MTCHC. Individuals can see a medical provider, obtain a physical examination, be tested for STDs, and be treated if positive.

**Figure 43. Gonorrhea by Age and Gender, Davis County, 2021**



## Unique factors place youth at risk for STIs



**Insufficient Screening**  
Many young women don't receive the chlamydia screening CDC recommends



**Confidentiality Concerns**  
Many are reluctant to disclose risk behaviors to doctors



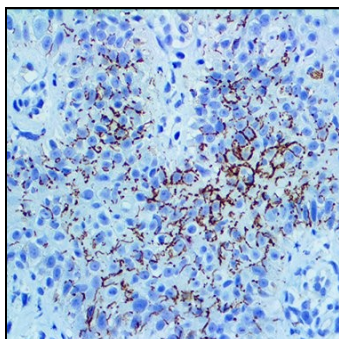
**Biology**  
Young women's bodies are biologically more susceptible to STIs



**Lack of Access to Healthcare**  
Youth often lack insurance or transportation needed to access prevention services



**Multiple Sex Partners**  
Many young people have multiple partners, which increases STI risk



Syphilis is an STD that can cause long-term complications if not treated correctly. Symptoms in adults are divided into stages: *primary*, *secondary*, *early latent*, and *late latent* syphilis.

Syphilis is a sexually-transmitted disease caused by the bacterial spirochete *Treponema pallidum*. Syphilis in adults are classified in stages: *primary*, *secondary*, *early latent*, and *late latent* syphilis. Syphilis is usually transmitted from person-to-person by direct contact with a syphilitic sore, known as a chancre, during sexual contact. Pregnant women with the disease can transmit it to their unborn child. Transmission to an unborn fetus causes congenital syphilis and can result in miscarriages, stillbirths, and death.

Syphilis has been called “The Great Pretender” as its symptoms can mimic many other diseases. The painless sore that appears initially when a person is first infected can be confused as a pimple or other seemingly harmless lesion.

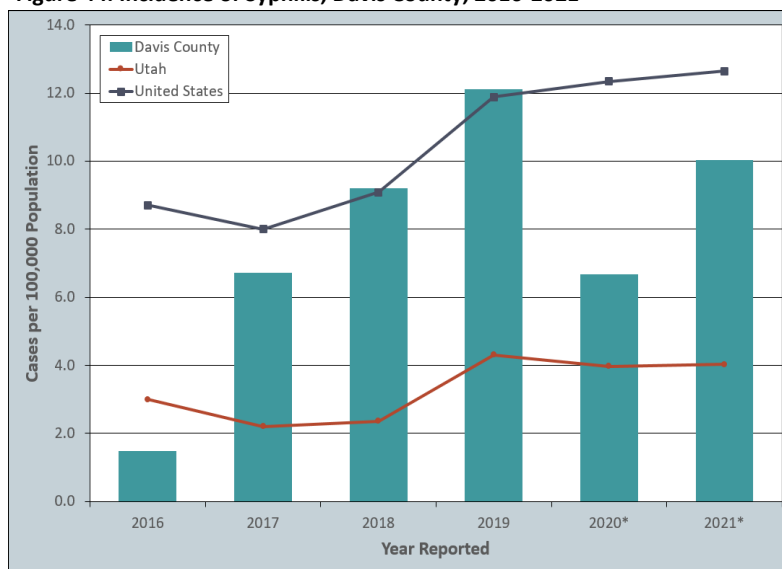
However, many of these syphilitic sores develop in the rectum or vagina and are not noticed. Thus, most transmission is from persons who are unaware of their infection. Over the past several years, syphilis has continued to increase among MSM. Recent national outbreaks among MSM have been marked by high rates of coinfection with HIV and high-risk sexual behaviors.

During 2021, there were **36** cases of syphilis reported in Davis County (see Figure 44). This is a 50.0% increase compared to 2020 when 24 cases were reported. Seven cases were classified as *primary*, 12 as *secondary*, three as *early latent*, and 14 as *unknown* or *late latent*.

Through disease investigations, it was noted that 16 (44.4%) of those infected with any stage of syphilis were MSM. Other identified risk factors include unprotected anal sex, injection drug use, multiple sex partners, anonymous sex with individuals of unknown STD/

HIV status, and substance abuse. The staging of syphilis is difficult and requires obtaining a thorough history (including past test results), risk factors, previous treatment regimens, and evaluation of symptoms. Partners’ disease status also helps in the staging process.

**Figure 44. Incidence of Syphilis, Davis County, 2016-2021**



\*Utah and United States 2020 and 2021 data are provisional.

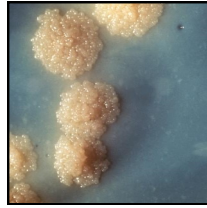
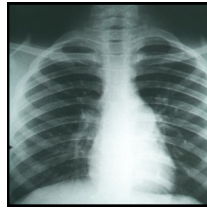
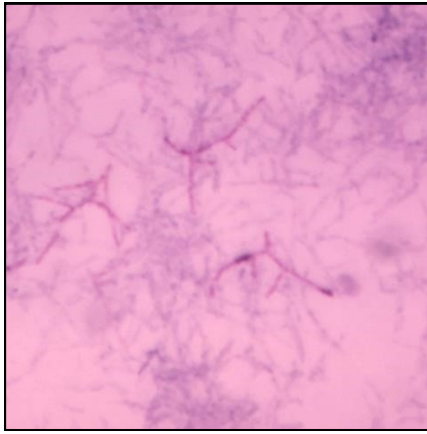
## Overview

A total of **36** cases of syphilis were reported during 2021 in Davis County.

Over the years, syphilis has continued to increase among men who have sex with men.

Overall, syphilis cases are higher in Davis County when compared to Utah.





# Tuberculosis

Tuberculosis (TB) is a disease caused by bacteria that are spread from person to person through the air. TB usually affects the lungs, but can also affect other parts of the body, such as the brain, kidneys, or spine.

Tuberculosis (TB) is caused by a type of bacteria called *Mycobacterium tuberculosis*. The bacteria usually attacks the lungs, but may attack any part of the body. It is typically spread through the air when a person with TB expels tiny, airborne particles. People nearby may breathe in these particles and become infected. Not everyone infected with TB bacteria becomes sick. As a result, two TB conditions exist: active TB disease and latent TB infection.

Approximately one-third of the world's population and 9 to 14 million people in the United States are infected with TB. On average, 10% of infected individuals will develop active tuberculosis at some point in their lives.

By the early 1980s, TB was considered to be under control and many states redirected TB prevention and control funds to other programs. As a result, the country experienced a resurgence of TB, with a 20% increase in cases reported between 1985 and 1992. Since then, the number of TB cases reported annually has decreased. With the introduction of HIV, TB rates remain a constant threat as it is a leading cause of death among those infected with HIV. Also, a new virulent strain of TB, extensively drug-resistant tuberculosis (XDR-TB), has been identified. This strain is resistant to many drugs used to treat tuberculosis and has a high mortality rate.

In 2021, there was **one** new active tuberculosis disease case (see Figure 45) and **74** newly identified latent tuberculosis infections in Davis County (see Figure 46).

Figure 45. Active Tuberculosis Cases by Year, Davis County, 2005-2021

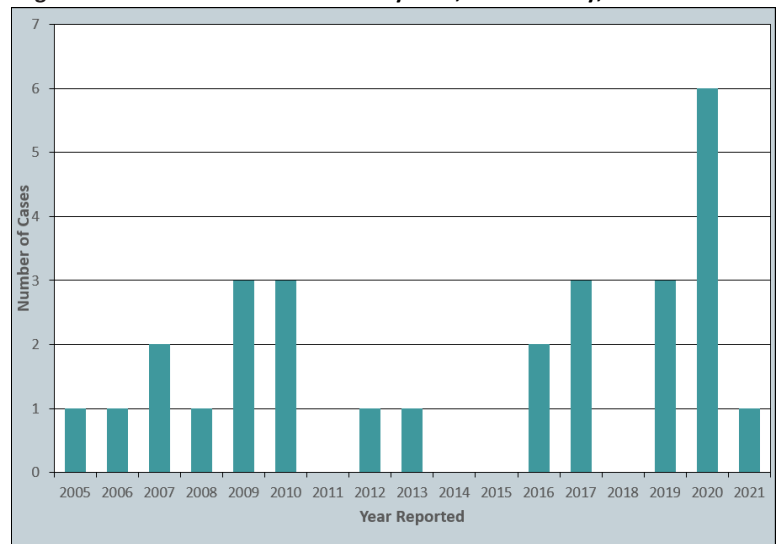
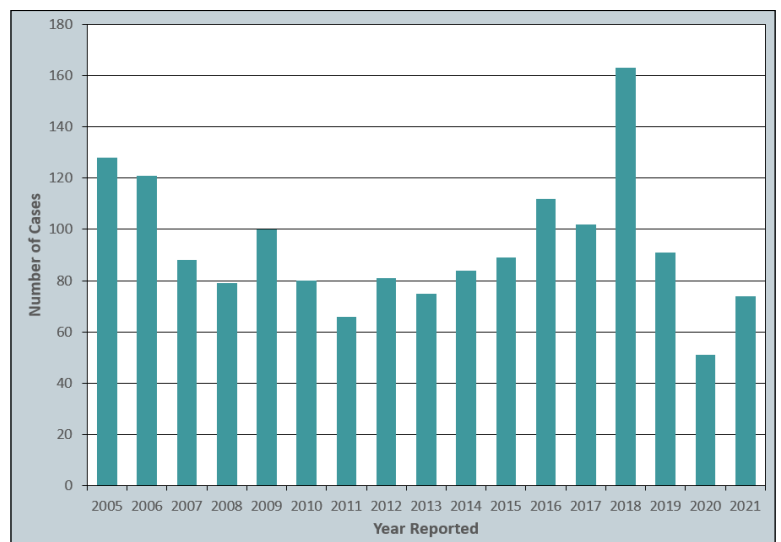
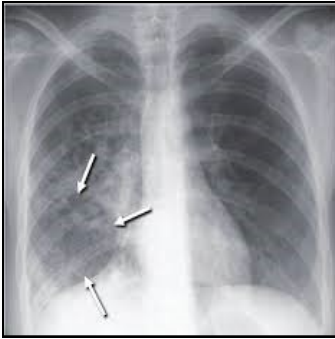


Figure 46. Latent Tuberculosis Infections (LTBI) by Year, Davis County, 2005-2021







TB is a disease caused by *Mycobacterium tuberculosis*. This bacteria usually attack the lungs, but can attack any part of the body, such as the kidney, spine, and brain.

TB bacteria become active if the immune system cannot stop them from growing. When TB bacteria begin to multiply in the body, it is called active tuberculosis disease (ATBD). When ATBD manifests in the lungs, it is known as pulmonary TB. Whereas, when it manifests in other parts of the body, it is classified as extra-pulmonary TB.

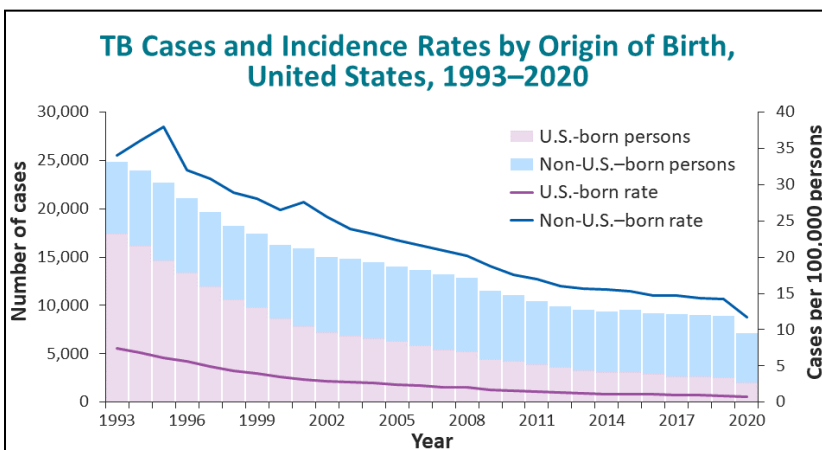
In 2020, 10 million people worldwide became sick with ATBD resulting in approximately 1.5 million TB-related deaths. In the United States, there were 7,174 TB cases in 2020 (2.2 cases per 100,000 persons). This represents a 19.4% decrease compared to the 8,904 cases reported in 2019. In the United States, tuberculosis is primarily seen in individuals who are foreign-born or have traveled/lived in endemic countries (see Figure 47).

Utah had **17** confirmed cases (0.5 cases per 100,000 persons) reported in 2021 (Utah data is provisional for 2021). Davis County had **one** new case of active tuberculosis identified in 2021.

Management of active tuberculosis cases requires close collaboration between several agencies including local health departments, medical providers, the Utah Department of Health, the Utah Public Health Laboratory, and a commitment from the infected individual. Both pulmonary and extra-pulmonary TB typically require six months of treatment. Complicated cases of TB can require treatment to be extended up to two years (e.g. meningial, multi-drug resistant/extensively-drug resistant (MDR/XDR)).

Patients with infectious pulmonary TB, which is of most concern for public health, are isolated until sputum sample tests indicate the individual is no longer infectious. To ensure compliance to treatment, medication is administered under Directly Observed Therapy (DOT). Because DOT can seem personally invasive to the patient, strategies to promote a

**Figure 47. Number of TB Cases Among Foreign-born Persons, United States, 1993-2020**



less intrusive and more flexible schedule are implemented whenever possible. These include bi-weekly/tri-weekly treatments, home visits, and video-conferencing.

## Overview

One new case of active tuberculosis was reported in Davis County in 2021.

On average, Davis County investigates about one case of active tuberculosis each year.

In the United States, tuberculosis is primarily seen in individuals who are foreign-born or traveled/lived in endemic countries.

# Latent Tuberculosis Infection

## Overview

During 2021, Davis County managed **74** patients with LTBI.

The majority of individuals who receive LTBI treatment in Davis County are foreign-born or traveled/lived in endemic countries.

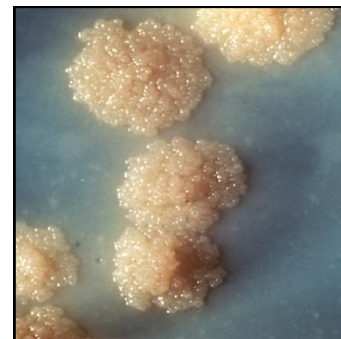
DCHD provided **772** tuberculin skin tests to the public in 2021.

Latent tuberculosis infection (LTBI) is a condition in which tuberculosis bacteria are alive, but inactive in the body. People with LTBI have no symptoms, cannot spread TB to others, and usually have a positive skin test reaction or interferon gamma-release assay (IGRA) blood test. Development into active disease occurs in about 10% of those who do not receive treatment for LTBI.

Approximately 200 clients are referred to DCHD annually for tuberculosis evaluation. These evaluations can include interviews, repeat skin testing or blood screening tests, chest x-rays, sputum testing, and physical exams in order to provide an accurate diagnosis.

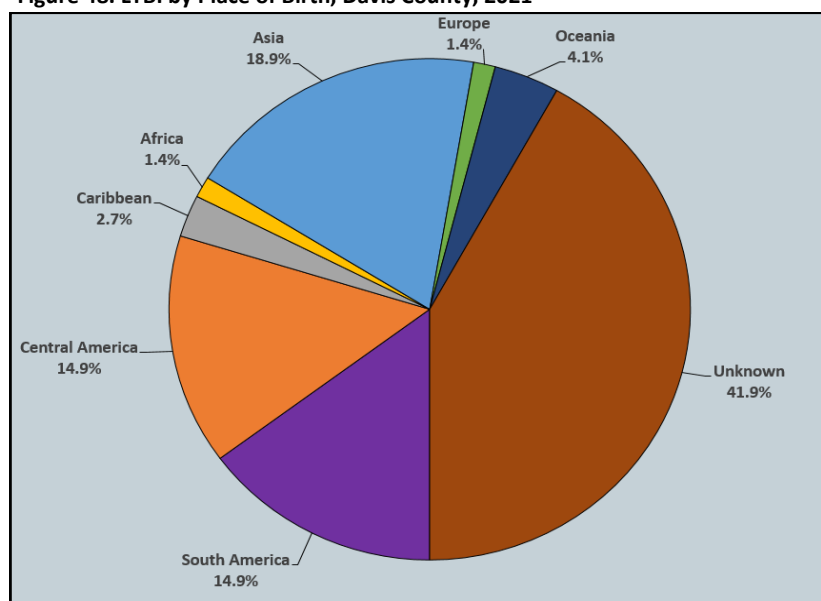
With the low incidence of ATBD in Davis County and Utah as a whole, the largest disease burden for tuberculosis falls under LTBI. During 2021, DCHD managed **74** clients with LTBI, with an average of **six** LTBI patients per month. Treatment reduces the risk that latent TB will progress to active disease and is essential to the control and elimination of tuberculosis disease. Case management includes initial testing to rule out active disease and ensuring appropriate treatment of the infection. The majority of individuals who receive LTBI treatment in Davis County are foreign-born (see Figure 48).

Typically, treatment for LTBI consists of daily antibiotic therapy for three to nine months. Individuals are monitored throughout therapy, but DOT is not necessary. In October 2012, use of a new LTBI treatment recommended by CDC was implemented in Utah. This new regimen is a combination of two drugs, taken once weekly for 12 doses. It is recommended for persons age two or older who are otherwise healthy, but also meet a certain set of criteria.



Persons with LTBI do not feel sick and do not have any symptoms. They are infected with *M. tuberculosis*, but do not have TB disease.

Figure 48. LTBI by Place of Birth, Davis County, 2021

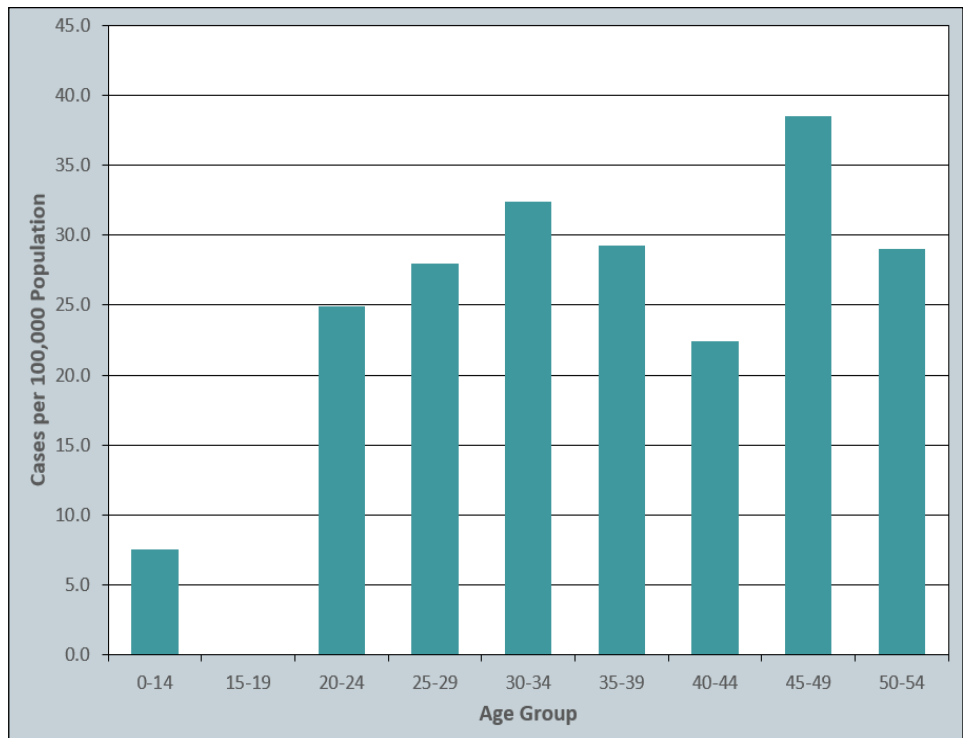


DCHD receives referrals for suspect active and LTBI from various medical facilities and providers. Screening tests consist of a tuberculin skin test (TST) or blood test (e.g. Quantiferon-Gold). Those with positive test results are often referred to the health department for evaluation and treatment. LTBI is not a reportable condition, but free or low-cost services are available for the community.

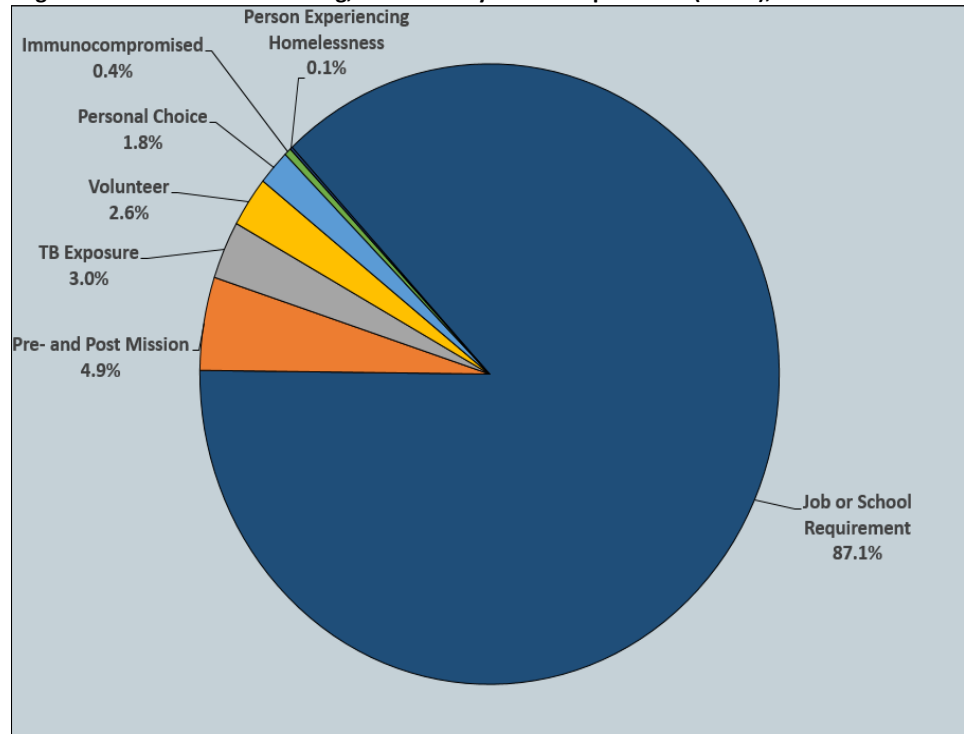
DCHD managed LTBI patients of almost all ages (see Figure 49). The age group with the highest frequency of cases was 45-49 years.

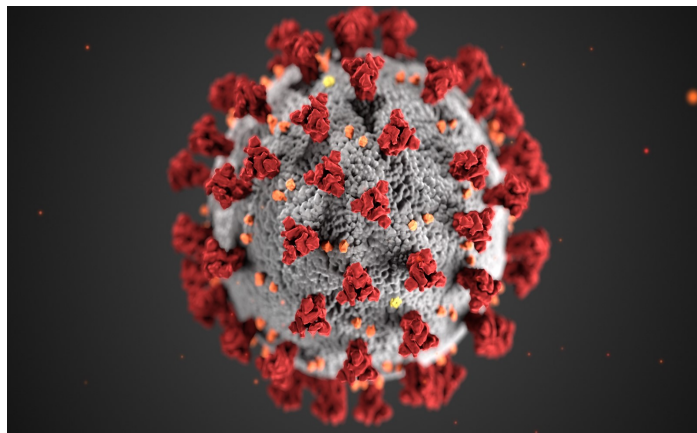
DCHD provided **772** TSTs to the public in 2021. However, these numbers only account for a small percentage of all TB tests performed in the community. Most often, those who sought TB testing through DCHD did so for a job or school requirement (87.1%). Other reasons included pre- and post-mission requirements (4.9%), TB exposure (3.0%), volunteer (2.6%), personal choice (1.8%), immunocompromised (0.4%) and person experiencing homelessness (0.1%) (see Figure 50).

**Figure 49. LTBI by Age Group, Davis County, 2021**



**Figure 50. Reasons for TB Testing, Davis County Health Department (DCHD), 2021**





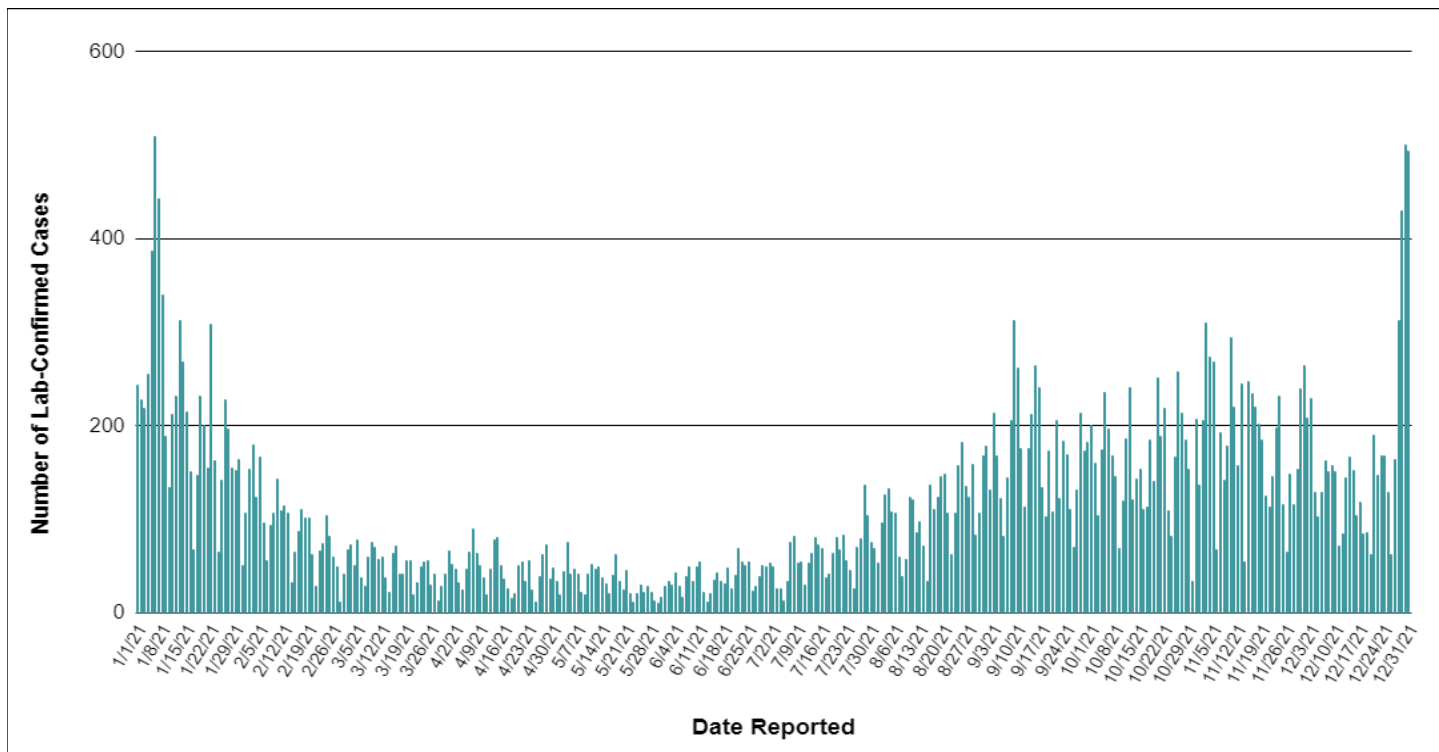
# Novel Coronavirus Disease (COVID-19)

Severe acute respiratory syndrome coronavirus (COVID-19) is transmitted through droplets from person-to-person.

Novel coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and is commonly known as COVID-19. Transmission of COVID-19 occurs through droplets spread from person-to-person. Droplets can enter through the eyes, mouth, or nose, usually from a cough or sneeze. Touching the eyes, nose, or mouth with hands contaminated with the virus may also cause infection. Symptoms include fever or chills, new loss of smell or taste, cough, fatigue, muscle or body aches, headache, sore throat, congestion, difficulty breathing, chest pain, nausea or vomiting, and diarrhea. COVID-19 is extremely contagious, which has allowed it to spread quickly.

COVID-19 case counts increased during the ongoing pandemic in 2021, when compared to 2020. During 2021, there was a total of **41,079** reported cases, an increase of 62.4% from the 25,297 cases reported in 2020 (see Figure 51).

Figure 51. Number of Lab-Confirmed COVID-19 Cases, Davis County, 2021



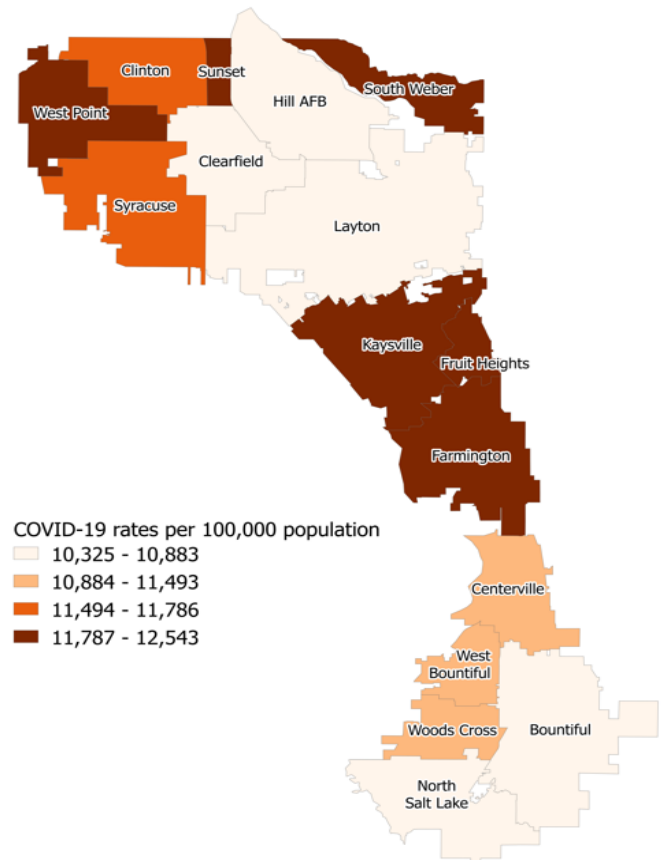
# Novel Coronavirus Disease (COVID-19)

In 2021, COVID-19 occurred in every city throughout the county (see Figure 52). West Point, Sunset, South Weber, Kaysville, Fruit Heights, and Farmington had the highest incidence rate; North Salt Lake, Bountiful, Layton, Clearfield and Hill Air Force Base had the lowest incidence rate. The overall incidence rate of COVID-19 in Davis County through 2021 was **11,315.5** cases per 100,000 residents.

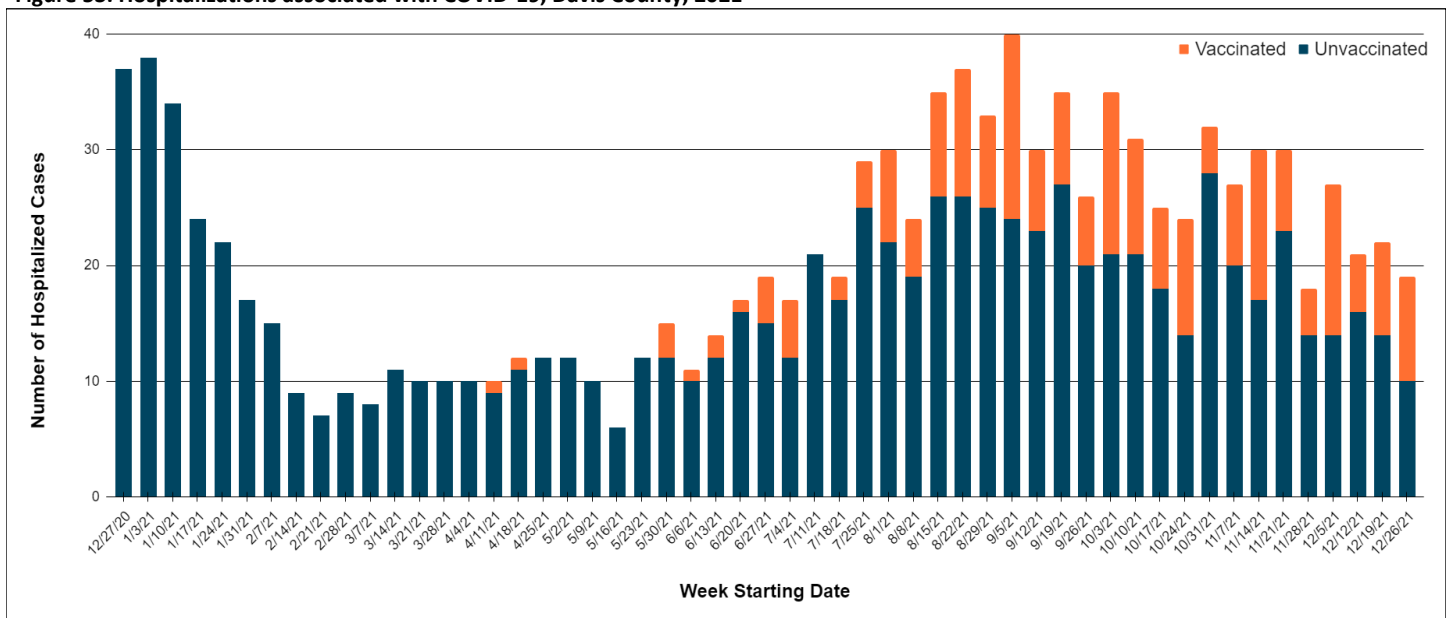
During 2021, because of the high incidence of COVID-19 within the community, focus was placed on those who were at a higher risk of transmission and severity of infection. Congregate living facilities faced unique threats from COVID-19 transmission due to the close proximity of residents. There were a total of **51** outbreaks located at congregate living facilities in 2021.

In 2021, hospitalizations associated with COVID-19 in Davis County were at their highest during the week beginning September 5 (see Figure 53). Unvaccinated individuals attributed to 81.4% of total COVID-19 hospitalizations. Individuals who were hospitalized and completed their primary vaccination series are considered vaccinated hospitalizations. The total hospitalization rate was 311.8 per 100,000 residents, with a total of **225** deaths due to complications with COVID-19 in 2021.

**Figure 52. Incidence of COVID-19, Davis County, 2021**



**Figure 53. Hospitalizations associated with COVID-19, Davis County, 2021**



# Novel Coronavirus Disease (COVID-19)

On December 15, 2020, the first dose of the COVID-19 vaccine was given in Utah. Healthcare workers were given priority to receive the vaccine series at this time. During 2021, COVID-19 vaccines were approved (under the Emergency Use Authorization) for different groups at varying times. DCHD provided over half of the COVID-19 vaccines given to Davis County residents in 2021. DCHD vaccines were distributed through a mass vaccination clinic and many outreach clinics. The following dates highlight when the vaccines were approved for different parts of the public:

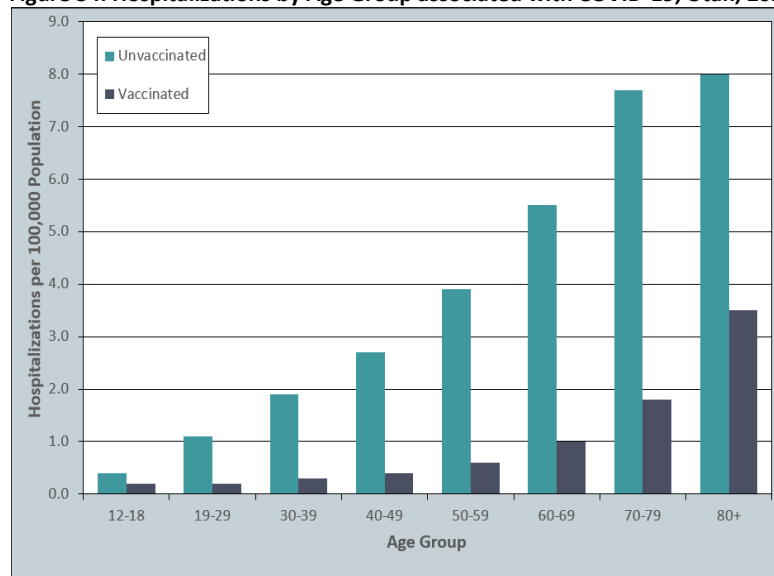
- **January 18, 2021**, individuals aged 70 years and older (first and second doses of the Pfizer or Moderna vaccine);
- **February 18**, individuals aged 65 years and older;
- **February 25**, individuals 16 years or older with high-risk medical conditions;
- **March 8**, individuals 50 years and older;
- **March 24**, individuals 16 years or older;
- **May 13**, adolescents between the ages of 12 and 15 years;
- **August 13**, additional 3rd dose beyond the first and second shots provided for Pfizer and Moderna were approved for individuals who are immunocompromised (age 12 years and over for Pfizer, age 18 years and older for Moderna);
- **August 23**, the U.S Food and Drug Administration gave full approval, beyond the Emergency Use Authorization, to the Pfizer vaccine;
- **September 24**, a booster shot became available for those who received Pfizer and was distributed to those aged 65 years and older, and those who are considered to be at high-risk;
- **October 22**, Moderna and Janssen both received approval for booster shots for those aged 18 years and older;
- **November 2**, Pfizer vaccine became available to children between the age of five to 11 years;
- **December 9**, Pfizer booster shot became eligible for individuals aged 16 years and older;

The COVID-19 vaccine is the most effective way to prevent infection and severe health outcomes. However, individuals who have completed the primary series of their COVID-19 vaccinations can still get COVID-19; this is called a

breakthrough case. Breakthrough cases are still less likely to have severe symptoms and develop serious illness that leads to hospitalization when compared to those who are unvaccinated (see Figure 54).

These differences in severe health outcomes are borne out in statewide COVID-19 data from February 1, 2021 to December 21, 2021, just prior to the Omicron wave. Unvaccinated Utahns were 4.9 times as likely to be hospitalized for COVID-19 when compared to those who were fully vaccinated. This same pattern of risk was seen in COVID-19 mortality. Unvaccinated Utahns were 6.1 times as likely to pass away due to COVID-19 when compared to those who were fully vaccinated.

**Figure 54. Hospitalizations by Age Group associated with COVID-19, Utah, 2021**

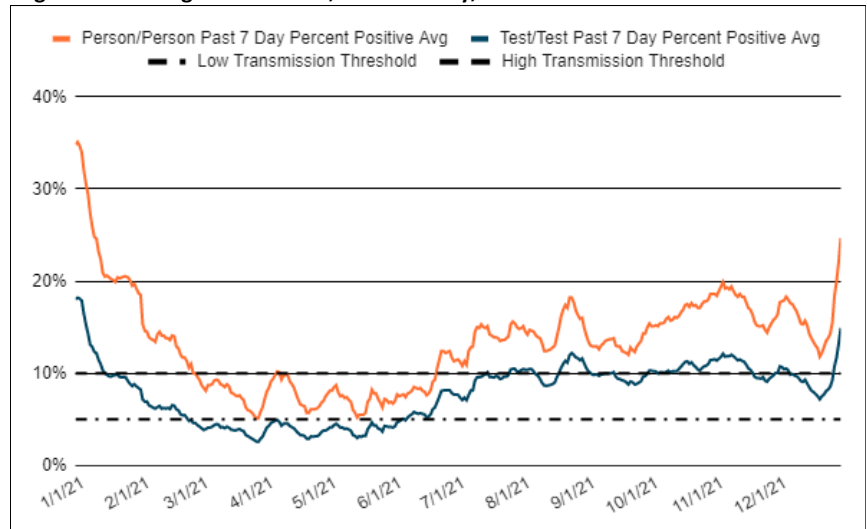




# Novel Coronavirus Disease (COVID-19)

Testing is crucial to help identify positive cases, detect potential outbreaks, and prevent the spread of COVID-19. Testing is available throughout Davis County using polymerase chain reaction (PCR) and antigen tests. When test results are reported to DCHD, two methods are used to calculate the results. The first method is called the *test over test* method. This is calculated by taking the total number of positive tests over the number of all tests conducted within a single day. The second method is the *person over person* method, which is calculated by taking the number of people who tested positive over the number of people tested. For the *person over person* method, one test result is counted per person every 90 days. All COVID-19 cases in Davis County were lab-confirmed with a PCR or antigen test and reported to DCHD (see Figure 55).

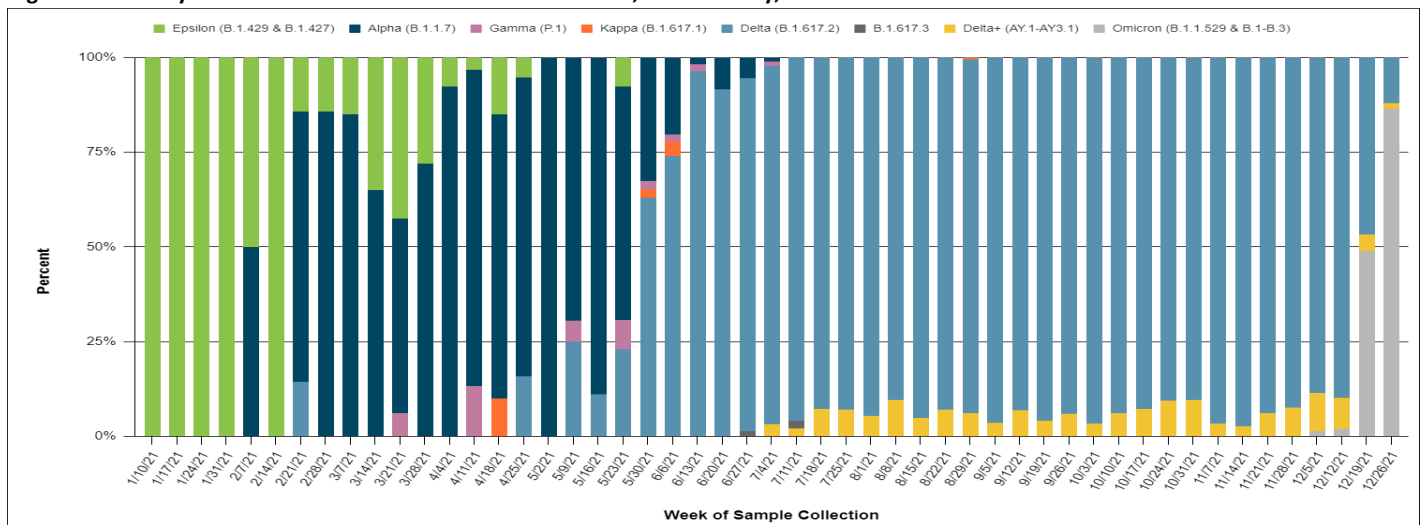
**Figure 55. Testing for COVID-19, Davis County, 2021**



During 2021, several COVID-19 variants were identified. Variants of COVID-19 are identified through whole genome sequencing. The most notable variants were Alpha, Delta, and Omicron, each being predominant at different times throughout the year (see Figure 56). In the beginning of 2021, the Alpha variant was the most common variant circulating. Delta was the most prominent variant during the majority of 2021. However, in December 2021, the Omicron variant quickly became the most prevalent circulating variant.

Each variant had different characteristics as the virus evolved. The Alpha variant (B.1.1.7) is more transmissible and has an increased disease severity compared to wild type COVID-19. The Delta variant (B.1.617.2) has increased transmissibility, reduction in vaccine efficacy, and decreased effectiveness of monoclonal antibody treatments. Also, current data suggests the Delta variant has increased disease severity compared to the Alpha variant. The Omicron variant (B.1.1.529 and B.1-B.3) has increased transmissibility, reduction in vaccine efficacy, ineffectiveness of multiple treatments, but has decreased disease severity.

**Figure 56. Weekly Prevalence of COVID-19 Variants of Concern, Davis County, 2021**



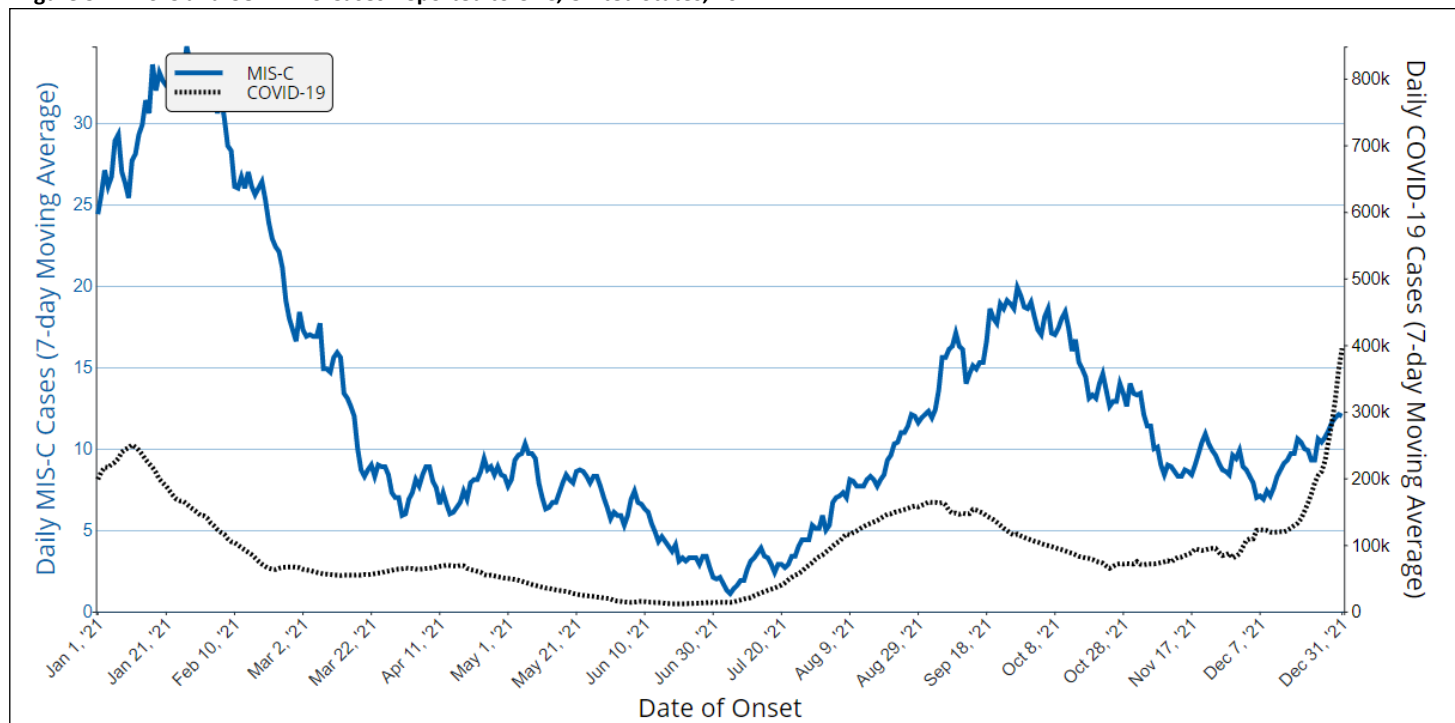
## Multisystem Inflammatory Syndrome - Children (MIS-C)

Multisystem Inflammatory Syndrome in children (MIS-C) associated with COVID-19 is a condition that causes inflammation in the heart, lungs, kidneys, brain, skin, eyes, and/or gastrointestinal organs in individuals under the age of 21. It is still unknown as to why some children develop MIS-C and others will not. Children diagnosed with MIS-C were known to have the COVID-19 virus or were exposed to someone with COVID-19, typically within four weeks of developing symptoms. The symptoms of MIS-C include stomach pain, bloodshot eyes, diarrhea, dizziness, skin rash, and vomiting. MIS-C is known to be serious, however, most children recover with proper medical care.



Though much is still being researched about MIS-C, cases are very uncommon. During 2021, Davis County had **ten** cases of MIS-C, an increase of 233.3% when compared to the three cases in 2020. There was no official case count of MIS-C for the state of Utah. However, all MIS-C cases are reported to the CDC. During 2021, the daily MIS-C (7-day moving average) cases were highest during January and February (see Figure 57).

Figure 57. MIS-C and COVID-19 Cases Reported to CDC, United States, 2021



# Davis County Demographics—2021

**Table 7. Davis County Population, by Age Group\***

Age Group	Population
<1 year	5,176
1-14 years	87,325
15-24 years	53,121
25-44 years	103,846
45-64 years	71,486
65-84 years	34,169
85+ years	4,109
<b>Total</b>	<b>359,232</b>

**Table 8. Davis County Population, by Gender\***

Gender	Population
Male	181,667
Female	177,565
<b>Total</b>	<b>359,232</b>

**Table 9. Davis County Population, by Race\***

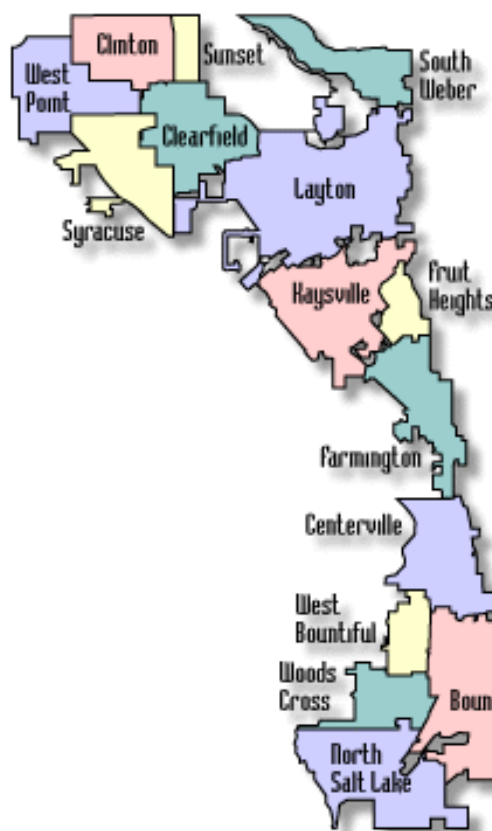
Race	Population
White	330,054
Black	5,298
American Indian or Alaskan Native	2,930
Asian	7,703
Native American or Pacific Islander	3,041
2 or More Races	10,206
<b>Total</b>	<b>359,232</b>

**Table 10. Davis County Population, by Ethnicity\***

Ethnicity	Population
Hispanic or Latino (of any race)	37,297

\*Population estimates for 2021 are not yet available. These figures represent the estimates for 2020.

**Source:** Retrieved January 2022 from Utah Department of Health, Center for Health Data and Informatics, Indicator-Based Information System for Public Health. Available at: <https://ibis.health.utah.gov/>



**Table 11. Davis County Population, by City\***

City	Population
Bountiful	45,762
Centerville	16,884
Clearfield	31,909
Clinton	23,386
Farmington	24,531
Fruit Heights	6,101
Hill Air Force Base	3,310
Kaysville	32,945
Layton	81,773
North Salt Lake	21,907
South Weber	7,867
Sunset	5,475
Syracuse	32,141
Unincorporated County	398
West Bountiful	5,917
West Point	10,963
Woods Cross	11,410
<b>Total</b>	<b>362,679</b>